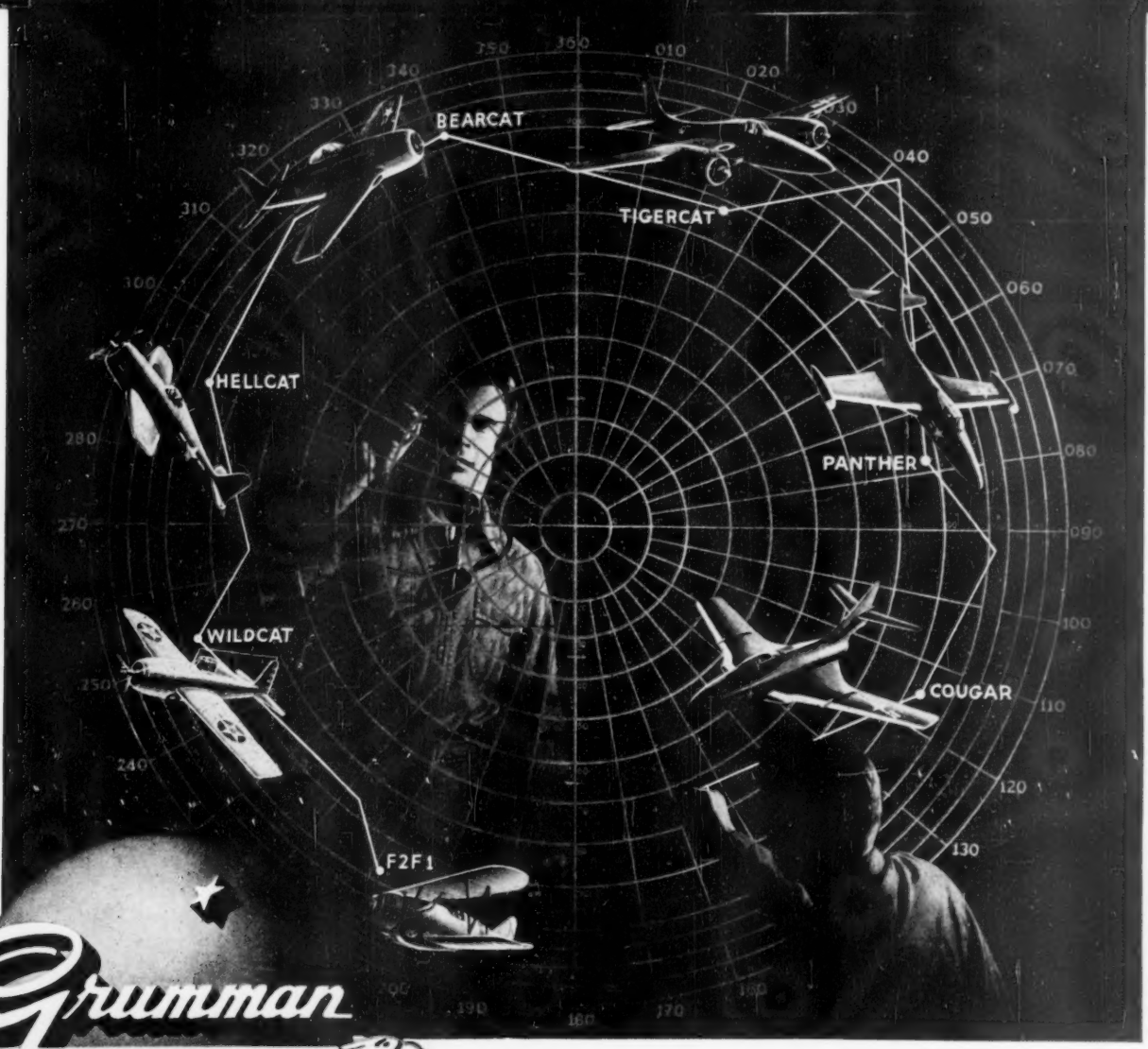
AVIATION WEEK

50 CENTS



Grumman

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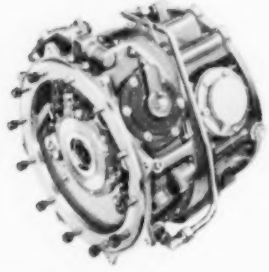
SUNDSTRAND

Constant Speed Drives for new Douglas twin jet

Manufactured at the Douglas Long Beach, California, Division

Make possible the use of constant frequency a-c current on U.S. Air Force's new photo-reconnaissance plane...the Douglas RB66A



"SANDWICH MODEL" OFFERS EXTREME COMPACTNESS

Mounted to a 10-inch pad, the "Sandwich Drive," together with the constant frequency alternator, provides an extremely compact and versatile assembly. Use of engine oil eliminates separate reservoir, cooler, and external piping. Installation and maintenance are simplified, since unit is bolted to engine. Maintains high efficiency, even at extremely high altitudes and over entire engine speed range.

Here's the new Douglas RB66A—a twin jet reconnaissance plane for the U. S. Air Force. It's a smooth, versatile performer, designed to operate in the stratosphere or over treetops for low-level missions.

This high performance aircraft will use the new J-71 engine which incorporates Sundstrand's "Sandwich Model" Constant Speed Drive. The drives convert the varying speeds of the turbo-jets to constant speed for driving constant frequency a-c generators. The generators supply power for hundreds of electrical components aboard the plane . . . with less than ±1/4% frequency variation in the 400-cycle output. Results—dependable a-c power plus savings in space and weight which help the fully equipped RB66A fly faster and farther.

The "Sandwich Model" Constant Speed Drive is another example of Sundstrand's contribution to solving design problems involved in the installation of a constant frequency a-c power system in the modern airplane. Any time you can use Sundstrand's "know-how" to help solve your a-c power generation problem, feel free to call upon us.

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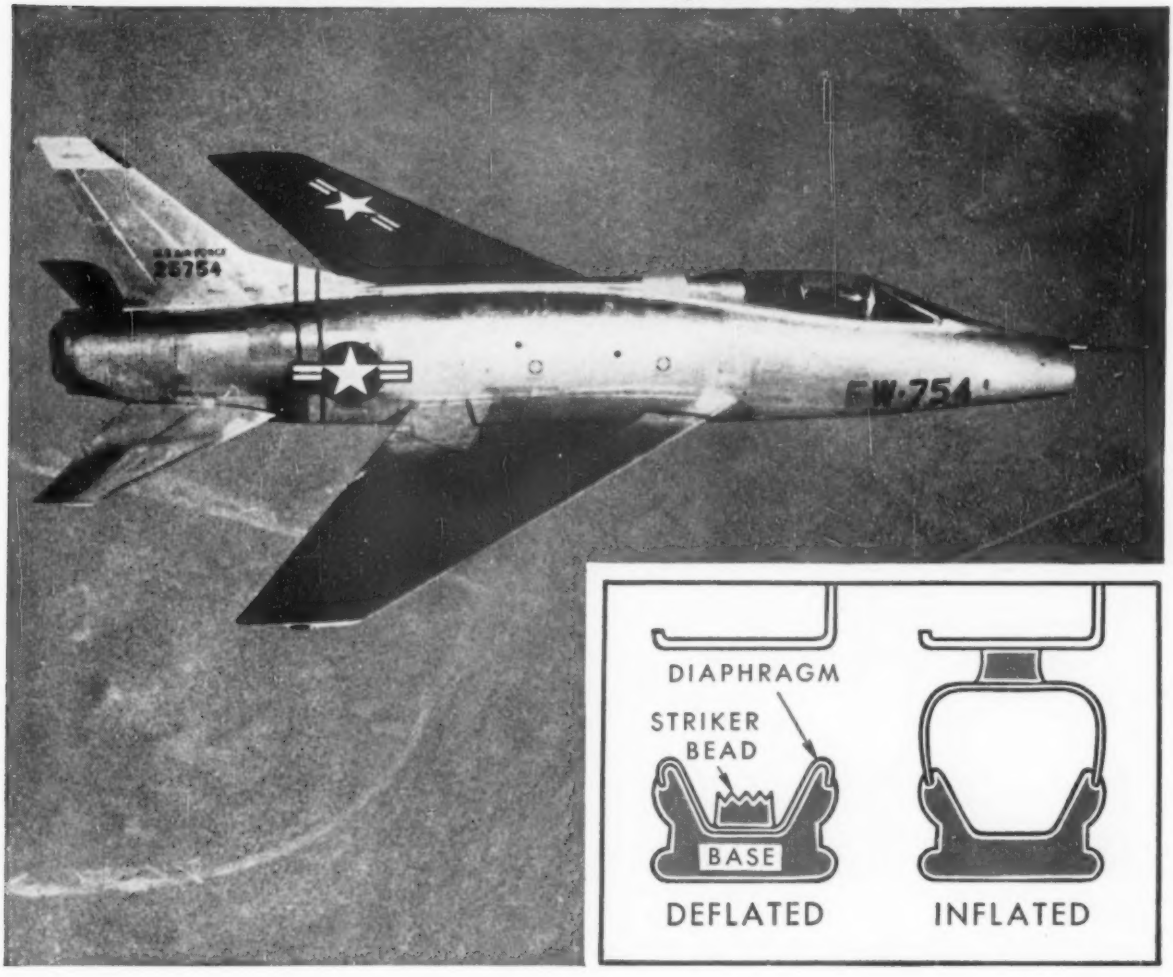
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Low-pressure seal prevents high altitude blowouts

BUBBLE type canopies on fast military planes like North American's Super-Sabre had to be safely pressurized at altitudes of 8 miles or higher. Ordinary inflatable seals between the bubble and cockpit would often blow out from the effect of low pressures on the outside, high pressures on the inside.

B. F. Goodrich engineers were called in on the problem. A really effective seal, they believed, should operate with low pressure and stretch very little or not at all. Less stretch would mean less strain. They worked out a seal with a U-shaped solid rubber base. A rubberized fabric diaphragm nested inside the base simply *lifts* when inflated. (See diagram above). It works like blowing up a paper bag—low pressure gives full expansion with practically no stretch. Dangerous stretching of tube wall (like blowing up a toy balloon) is eliminated.

The new inflatable strip seal works almost instantly. Even at minus 65° it inflates with less pressure than ordinary seals needed at room temperature. There are other advantages. It resists wear and damage better than ordinary seals. It fits complex curves better. It seals and unseals faster. Sliding wear and scuffing are minimized.

The new B. F. Goodrich seal is now in use on more than a dozen makes of planes, including latest jet fighters and bombers.

Other B. F. Goodrich products for aviation include: tires, wheels and brakes; De-Icers; heated rubber; Pressure Sealing Zippers; fuel cells; Rivnuts; accessories. *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

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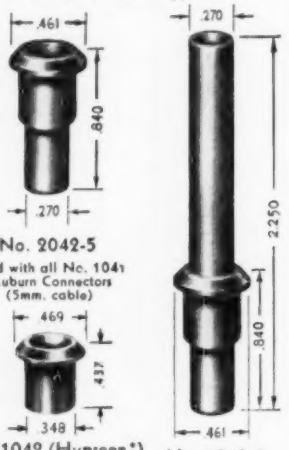
Ozone Resistant Hypreen*



No. 2042-5
Used with all No. 1041 Auburn Connectors (5mm. cable)

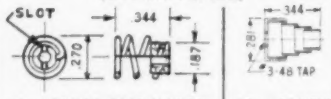
No. 1042 (Hypreen*)
No. 1043 (Silicone)
Used with all No. 1041 Auburn Connectors (7mm. cable)

No. 1042-5
Used with all No. 1041 Auburn Connectors (5mm. cable)

*Auburn Synthetic Rubber

SPRING AND EYELET ASSEMBLIES

(Used with 3-48 Stud)

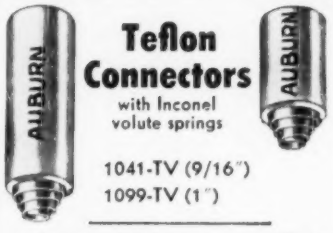


No. 1066-9A (AN 4164-22) with stainless steel coil springs

No. 1066-9V with Inconel volute springs

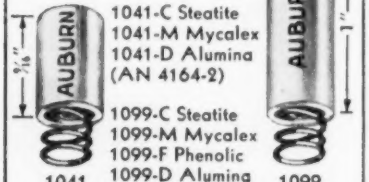
Teflon Connectors

with Inconel volute springs



1041-TV (9/16")
1099-TV (1")

Connectors with stainless steel coil springs



1041
1041-C Steatite
1041-M Mycalex
1041-D Alumina (AN 4164-2)

1099
1099-C Steatite
1099-M Mycalex
1099-F Phenolic
1099-D Alumina (AN 4164-1)

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Aviation Week

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A SALUTE TO THE DC-7

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This luxurious aircraft has been described as the fastest piston-powered commercial airliner in the world today. Its superior range and speed make possible new transcontinental and trans-oceanic non-stop schedules that are faster than existing services provided by any other aircraft!

To the Douglas Aircraft Company, designers and manufacturers of the DC-7, and American Airlines, first to operate the DC-7 non-stop coast-to-coast, The Dow Chemical Company would like to extend its heartiest congratulations.

Dow, major producer of magnesium, the world's lightest structural metal, takes pride that Douglas engineers specified the use of magnesium sheet and extrusions for the flap-vanes, floor beams and many other vital parts of the DC-7. Dow is pleased, too, that Douglas, like most other aircraft and airframe builders, relies on the use of magnesium in its varied forms to help solve many other weight and strength problems.

For the answer to your questions on magnesium, write to the Magnesium Dept., THE DOW CHEMICAL COMPANY, Midland, Michigan.

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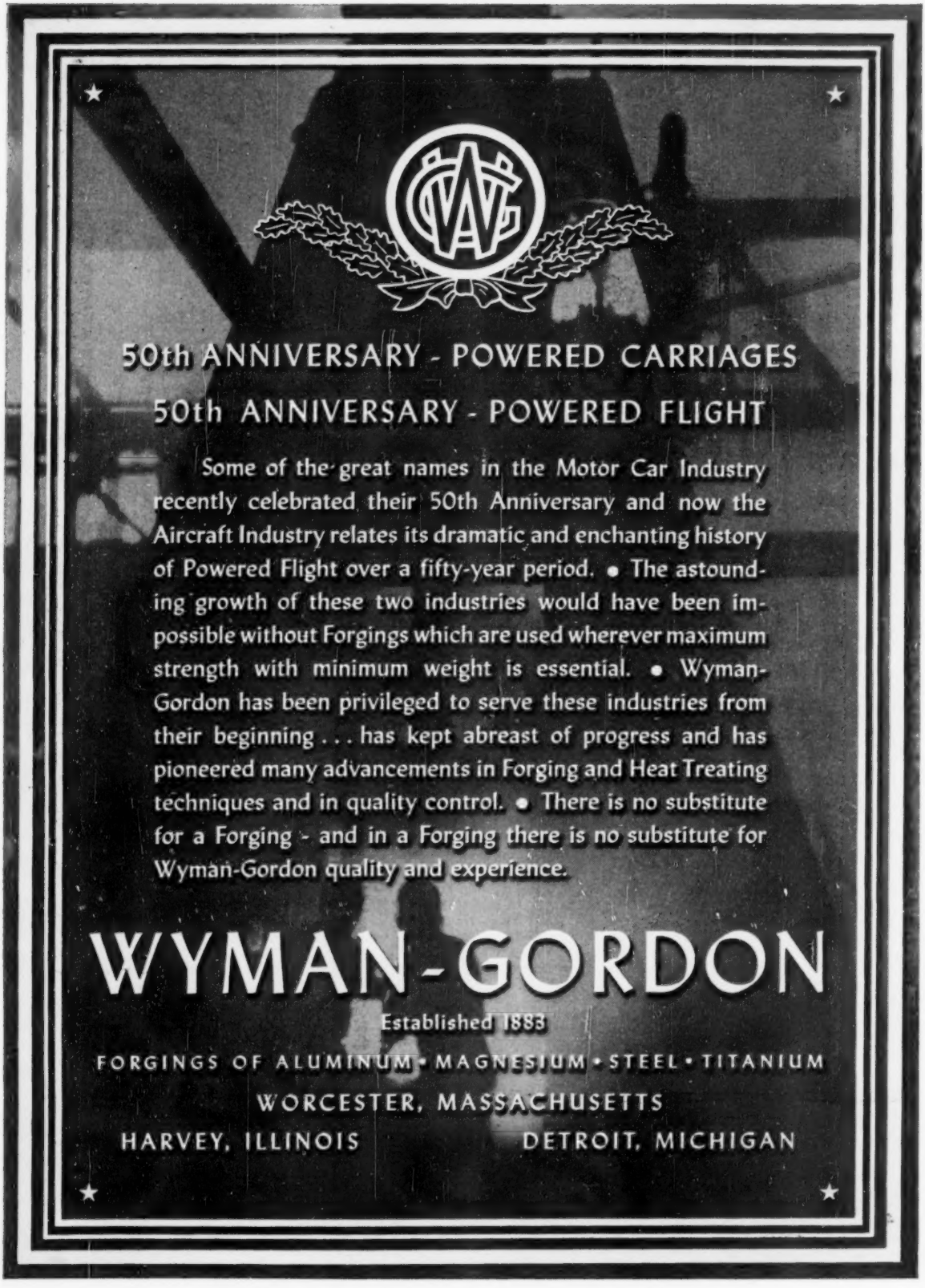
50th ANNIVERSARY - POWERED CARRIAGES
50th ANNIVERSARY - POWERED FLIGHT
Some of the great names in the Motor Car Industry recently celebrated their 50th Anniversary and now the Aircraft Industry relates its dramatic and enchanting history of Powered Flight over a fifty-year period. • The astounding growth of these two industries would have been impossible without Forgings which are used wherever maximum strength with minimum weight is essential. • Wyman-Gordon has been privileged to serve these industries from their beginning . . . has kept abreast of progress and has pioneered many advancements in Forging and Heat Treating techniques and in quality control. • There is no substitute for a Forging - and in a Forging there is no substitute for Wyman-Gordon quality and experience.
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NEWS DIGEST

Domestic

Turbine failure in a Wright Turbo Compound engine this month forced an American Airlines DC-7 to return to Los Angeles during an eastbound flight, the second such incident since AA began operating the Douglas transport (AVIATION WEEK Dec. 28, p. 7). In the latest failure, blades were stripped off one of three turbines on the No. 4 engine as the plane flew over Bryce Canyon, Utah. Crew noticed sparks flying from the nacelle, feathered the propeller and returned to Los Angeles without further incident.

Turboprop transports hold a strong edge over jet liners in quiet and economical operation, says Erle Martin, general manager of United Aircraft Corp.'s Hamilton Standard Division. The propeller producer's chief says an engineering study indicates a turboprop transport can equal speed of a jet liner.

Braniff Airways directors have elected Fred Jones, Oklahoma car dealer, chairman and Charles E. Beard president, filling top posts held by Thomas E. Braniff before he was killed Jan. 10 (AVIATION WEEK Jan. 11, p. 20). J. W. Miller replaces Beard as executive vice president. The airline's board also has appointed Thomas F. Ryan chairman of the executive committee.

Improved armament systems for Boeing B-47s and Douglas B-66s will be designed by General Electric's aircraft products department under a new $5-million USAF contract.

Quick Senate confirmation of Harmar D. Denny's reappointment to a six-year term on Civil Aeronautics Board appears likely. No opposition to the CAB vice chairman was offered during a brief, routine hearing before the Commerce Committee.

Candidates frequently mentioned for appointment as technical staff director of the newly reorganized Air Navigation Board include Sam Saint, chief of Air Transport Assn.'s Navigation and Traffic Control Division, and Col. Ernest C. Wood, Army's representative on the old ANDB.

Aerocar has set a price tag of $25,000 on its "flying automobile," reports delivery can be made from the Longview, Wash., plant in four months.

Financial

Beech Aircraft Corp., Wichita, has omitted its regular 25-cent dividend for the quarter ended Dec. 31, pending payments due the plane producer from USAF after cancelation of its T-36 contract. It was the second such action taken in the past four months (AVIATION WEEK Nov. 9, p. 7).

Doman YH-31 Put Through Paces

Doman YH-31 makes a steep bank during a recent showing at Danbury, Conn., before the helicopter company's stockholders. Rapid climbs, hands-off flight and autorotation landings also were demonstrated for the visitors. Company president Glidden S. Doman told the shareholders the YH-31's performance has gained USAF research and development contracts for Doman and that military production orders are expected. Doman has licensed Hiller Helicopters to build the YH-31 in the U. S., and it also is to be made in Canada by Doman-Fleet Helicopters, Ft. Erie, Ont.

International

Investigators probing the crash of a Philippine Air Lines DC-6 Jan. 17 at Rome say there is no evidence so far to confirm reports that one or more engines were smoking before the transport plunged into a vacant lot and exploded, killing all 16 persons aboard. It was the first fatal accident in the carrier's international operation. The blast nearly disintegrated the DC-6, hindering investigation by representatives of PAL, Douglas Aircraft, Pratt & Whitney Aircraft and Curtiss Propeller.

Air France last week inaugurated 8-hr., nonstop first-class and tourist service between Mexico City and New York, operating Constellations and Super Connies on twice-weekly flights. The new service connects with the carrier's trans-Atlantic flight and operates under an air agreement recently signed by U.S., France and Mexico.

New speed records claimed by two airlines for trans-Atlantic routes: Air France Super Constellation flew from New York to Paris in 9 hr. 55 min., clipping 18 min. off the previous best mark for the 3,671-mi. flight. KLM Royal Dutch Airlines Super Constellation broke the New York-Amsterdam record, flying the 3,400-mi. route in 10 hr. 14 min.

KLM Royal Dutch Airlines management has been taken over by executive vice presidents F. Van Balluseek, F. Besancon and M. J. van der Ploeg, pending appointment of a successor to the late Albert Plesman by the carrier's board of control.

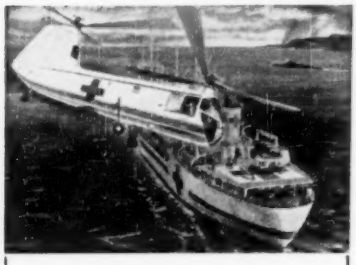
Czechoslovak State Airline transport crash near Prague Jan. 12, killing 15 persons, Prague newspaper Rude Pravo reports.

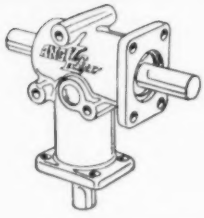
Airport user charges will be levied by New Zealand on domestic and international airlines beginning next April to help pay for building and maintaining fields and other aviation facilities. Estimated yield in 1954: $3,360,000.

Col. Luis Calderon, former air attache of the Venezuelan embassy in Washington, is new president of government-owned Linea Aeropostal Venezolana.

ANGLgear
TRADE MARK

SERVES IN NAVY'S HUP-2





This right angle drive is part of the control system for the fuel shut-off valve. ANGLgear is often the choice when compact design and high capacity are required. These qualities make it a favorite among designers—specified equipment in many aircraft.

Model R-300 is rated at 1/3 hp at 1800 rpm—Model R-320 at 1 hp. Both models have hardened gears and ball bearings, are lubricated for life. Both are made with 1:1 ratio and with 2-way or 3-way shaft extensions.

ANGLgears are described fully in the I.A.S. Aeronautical Engineering Catalog. Refer to this publication for complete information, or write us direct.

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Washington Roundup

Aircraft Spending

Actual cash outlay for military aircraft procurement is scheduled to remain at a high level until the middle of 1955, according to President Eisenhower's fiscal 1955 budget message to Congress. The President estimates military aircraft procurement spending will total $8.4 billion in fiscal 1954, $8.3 billion in fiscal 1955 ending June 30, 1955.

Strategic Squabble

Big stumbling block in organizing future off-shore aircraft procurement program is Britain's bid to get the United States to finance a large share of the Royal Air Force's strategic bomber fleet.

Britain wants to build its own strategic atomic bomber force of Vickers Valiants, Avro Vulcans and Handley Page Victors, but wants U. S. to help foot the bill to the tune of about $100 million annually. Foreign Operations Administrator Harold Stassen supports the RAF plan, but is getting bitter opposition from the Pentagon where feeling is that the U. S. taxpayer will have enough trouble supporting USAF's strategic air force and the Navy attack carrier forces without underwriting the RAF bomber program.

Previously, off-shore aircraft procurement funds were devoted to fighter planes in an effort to plug serious deficiencies in Western Europe's air defense.

New Combat Cargo Command?

Air Force is considering reorganizing a large portion of its military air transport resources into a new combat cargo command on the model pioneered in the Korean war by Lt. Gen. William Tunner and Brig. Gen. John P. Henebry.

The Korean Combat Cargo Command pooled all transport resources in the theater into a single organization trained to perform all types of airlift missions and operated directly under the theater commander on daily priority of missions established by the top combat leaders.

Korean experience indicates the combat cargo command philosophy resulted in increased airlift and better coordination with top combat emergencies with a smaller, better-equipped force.

Under the new plan MATS would be stripped of its cargo-carrying function.

Policy Progress

The two major policy problems just added to the agenda of the air policy review requested of Air Coordinating Committee by the President probably will not be completed by the Apr. 1 deadline.

These are:

• Policy toward aircraft manufacturers (AVIATION WEEK Jan. 4, p. 12). Aircraft Industries Assn. forced late addition of this problem to the policy review agenda, but so far has produced no recommendations for inclusion therein.

• Review of air traffic control development and operations. Present system and program were first blueprinted by Radio Technical Committee on Aviation (RTCA) shortly after World War II and crystalized into an operational pattern by Air Coordinating Committee's Special Working Group 5 in 1950.

Overseas Mail Problem

Civil Aeronautics Board will investigate proposals by two nonskeds, Seaboard & Western and Transocean Air Lines, to fly military mail under contract. They have negotiated agreements with the military to haul overseas Army and Fleet Post Office mail for about 25 cents a ton-mile, compared with certificated airlines rates running near $1.

CAB has maintained that the government still gains by shipping mail via these subsidy carriers because if the space goes empty, the U. S. pays for it in subsidy anyway.

The CAB investigation will "determine whether (the low nonsked rates) should be rejected on the ground that APO and FPO mail does not constitute 'property' (freight) within the meaning of Seaboard's and Transocean's authorizations from the Board to transport property . . . and . . . therefore, that (they) do not possess legal authority to transport the same."

User Charge Tactics

Air Transport Assn. plans to capitalize on the President's linking of federal auto gas taxes to the level of federal-aid highway appropriations in his State of the Union message. Treasury and Commerce Departments have maintained that fuel taxes are "general revenue" and not to be earmarked for the special benefit of those paying them.

The airlines say they already pay their share of CAA airways cost through their two-cent gas tax and therefore oppose the extra "user charge" proposed by CAA. The President's linking of gas taxes to highway expenditures gives stature to the ATA claim that the airlines already pay their way on the aerial highways.

On the highway tax, Rep. Peter Mack already has introduced a bill to raise federal-aid highway appropriations to the level of the auto gas tax revenue. Air Transport Assn. may urge introduction of a similar bill for CAA airways appropriations, which would obviate need for all or most of the proposed user charges.

Welcome Proposal

CAB member Joseph Adams' proposal that the states should generate some responsibility for sustaining local airlines is being welcomed enthusiastically in some Congress circles.

Sen. Edwin Johnson, who has been skeptical of Adams' record on the Board, commented: "In pointing out deficiencies which have existed in relationships between the local airlines and the states and communities they serve, and in recommending specifically how these deficiencies can be eliminated, member Adams has offered a sound, constructive approach whereby the states can offer support to our local service carriers, supplementing the support and encouragement given them by the federal government."

CAB Subsidy

As Civil Aeronautics Board's $80-million airline subsidy budget went into appropriations hearing last week, the Board counted on chairman Chan Gurney's stature as a former senator to smooth proceedings. This is the first year that subsidy has been earmarked as an appropriation wholly apart from Post Office's airmail appropriations.

—Washington staff

INDUSTRY OBSERVER

► President Eisenhower has confirmed that research on use of atomic power for aircraft propulsion will continue and specific funds will be requested in the fiscal 1955 budget to further this work.

► **Total U. S. military aircraft inventory is scheduled to increase from the 33,000 planes now on hand to 40,000 by the end of 1957. Currently about 11,000 military aircraft are jets. Total of jets is scheduled to rise to more than 20,000 by 1957.**

► Douglas YC-124B is undergoing taxi tests with its four Pratt & Whitney Aircraft T34 turboprops and is scheduled to fly soon. The YC-124B is an experimental prototype for the C-133 production version of the turboprop-Globemaster series.

► **Air Force decision on whether to order an all-weather version of the North American F-100 Super Sabre will hinge on the results of the current flight test program of the Convair F-102. If the F-102 looks promising USAF will skip the all-weather Super Sabre.**

► Navy security squabble is holding up release of information on two vertical-takeoff fighter prototypes built by Lockheed and Convair. Both are powered by Allison T40 turboprops.

► **Bristol Aeroplane Co., Ltd., has developed a new lightweight, medium-thrust, axial-flow gas turbine which it is calling the Orpheus. New engine is for operational jet aircraft and trainers.**

► Convair will build a maximum of 50 F2Y Sea Darts under a Navy production order for these hydro-ski-equipped fighters.

► **Westinghouse Electric Corp. seriously is considering setting up one of Navy's recently announced Project Tinkertoy mechanized assembly lines (Aviation Week Oct. 12, p. 72). Output reportedly would be used both for military electronic equipment and radio-television receivers. If the move is made, it will have wide repercussions in the avionics and consumer goods fields.**

► Navy is claiming a new altitude bail-out record as the result of a pilot leaving an F9F-6 at 33,000 ft. Pilot bailed out after an explosion accompanied by exceedingly high tailpipe temperatures and fire warning lights while flying at 38,000 ft. and 450 knots. He parachuted safely after a free fall of 25,000 ft.

► **Prototype Blackburn and General Beverley, RAF version of the four-engine Universal Freighter, landed in less than 700 yd. fully loaded in recent gross weight tests. Fixed tricycle landing gear is fitted with Dunlop Maxeret brakes. Reverse props were not employed in landing tests, company says. The transport climbed to 5,000 ft. on three engines, after fourth was cut at takeoff, maintained altitude on two engines.**

► It is no secret that Convair has been having stability problems with the F-102. Redesign work on the delta-wing aircraft already is under way.

► **Allison J33 recently completed 1,200 hr. operation without repairs at Webb AFB, Tex.**

► Air Materiel Command has developed a portable test stand for checking engine serviceability before mounting on bomber and cargo aircraft. The stand has an engine mount similar to an airplane, with controls and instruments duplicated.

► **Increasing number of chemical firms are considering production of foamed plastics for use in aircraft control surfaces as stiffening medium to replace conventional metal internal members.**

► Air Force is using actuarial tables in estimating life expectancy of aircraft engines and thus accurately forecasting engine needs.

WHO'S WHERE

In the Front Office

S. B. Withington is president of Avco Manufacturing Corp.'s newly consolidated Lycoming Division, Williamsport, Pa. Other new officers: **Floyd J. Bird**, vice president and Williamsport plant manager; **Dr. Anselm Franz**, vice president-turbine engineering; **James E. Mitchell**, vice president-industrial relations; **Arthur Nutt**, vice president-engineering; **Donald F. Turner**, vice president and Bridgeport (Conn.) plant manager, and **Clarence J. Mason**, controller.

H. M. Horner, president of United Aircraft Corp., has been elected to serve as board chairman of Chance Vought Aircraft during the Dallas aircraft builder's transition from a UAC division to a separate company (Aviation Week Dec. 14, p. 14).

G. S. Massa has resigned as vice president-manufacturing of Hydro-Aire, Burbank, Calif., to join Com-Air Products, also at Burbank, as vice president-operations.

Changes

Jay Morrison has become special assistant to the senior vice president of Boeing Airplane Co., Seattle. **Frank Terdina** has been promoted to acting manager of the Industrial Products Division.

W. Waits Smith has been appointed manager of Westinghouse Electric Corp.'s Aviation Gas Turbine Division, taking charge of the Kansas City, Mo., and Philadelphia plants.

W. E. P. Johnson, British turbine engine pioneer, is manager of Solar Aircraft Co.'s new European Division. Other changes in the San Diego firm: **Kent M. Campbell**, manager of the Dallas-Ft. Worth branch office; **William F. Cords**, assistant contracts manager; **Fred S. Hage, Jr.**, Des Moines contracts manager.

Dr. Charles J. Breitwieser has joined Lear, Inc., Los Angeles, as director of engineering.

Franklin R. Kadison has been appointed director of research and development for Sealtron Corp., Cincinnati.

Honors and Elections

Navy Capt. Charles F. Gell will receive the John Jeffries Award for aviation medical research from the Institute of the Aeronautical Sciences at the 22nd annual meeting this week in New York. Other awards: **Henry T. Harrison**, chief meteorologist for United Air Lines, Robert M. Losey Award for contributions of meteorology; **Ernest G. Stout** of Convair, Sylvanus Albert Reed Award for research in development of high-speed, water-based aircraft (see p. 22); **Dr. Donald Coles** of California Institute of Technology, Lawrence Sperry Award for study of supersonic skin friction.

James W. Austin, vice president of traffic and sales for Capital Airlines, has been re-elected chairman of Advertising Committee for Air Transport Assn.'s Air Traffic Conference.

G. W. Newton of Aro, Inc., is new vice president-aircraft powerplants for the Society of Automotive Engineers.

(*Continued on page 76*)

HAMILTON STANDARD . . . leader for years in propeller design and production, is supplying other equipment for such outstanding new U. S. Air Force jet fighters as North American's F-100 Super Sabre.

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MACWHYTE "HI-FATIGUE" CABLE

AVIATION WEEK VOL. 60, NO. 4
JANUARY 25, 1954

More Aircraft Over Longer Period

'55 Budget Reflects Airpower Stretchout

- **$4.7-billion request is slightly less than '54.**
- **New plane orders at odds with buildup strategy.**

By Katherine Johnsen

The $4.7 billion in new money requested in the President's budget for aircraft and related procurement in fiscal 1955 is slightly less than this fiscal year's $4.8 billion.

Here are the amounts, by services, proposed for fiscal 1955 aircraft and related procurement:

• **New money asked** for the Air Force is substantially down. The $2.7-billion request for fiscal 1955 compares with $3.5 billion for fiscal 1954.

• **Navy's allocation** of new money for aircraft and related procurement is up, however. The $1.9 billion asked for fiscal 1955 is $500 million more than the $1.4 billion for fiscal 1954.

The low request made for ordering new planes appeared to be at odds with the spirit of the President's budget message which stressed airpower as the key to the Administration's new defense strategy.

▶ **Biggest Slice**—"This budget is aimed . . . at providing a strong military position which can be maintained over the extended period of uneasy peace. It points toward the creation, maintenance and full exploitation of modern airpower," the message stated.

Biggest slice of the $29.3-billion total recommended for the three services, however, is for the Air Force. This total (which does not include money for public works) is divided among the services:

• **Army, $8.2 billion.**
• **Navy, $9.9 billion.**
• **Air Force, $11.2 billion.**

The $11.2-billion total USAF budget proposed for fiscal 1955 approximates the fiscal 1954 total of $11.4 billion, which includes more than $200 million for public works.

Naval Aviation's total budget of $2.9 billion proposed for fiscal 1955, however, is substantially more than the $2.4 billion for fiscal 1954.

The President's budget discloses that a major effort will be made to hold down spending on aircraft and related procurement which means stretching out production.

▶ **Spending Picture**—Air Force spending on aircraft procurement for the fiscal 1955 year is set at $6.7 billion, compared with $6.9 billion for the current fiscal year. Last summer, Defense Department estimated USAF procurement spending would go up to $9 billion in fiscal 1955. USAF now has $20 billion in unexpended procurement funds.

Naval Aviation spending for aircraft and related procurement is expected to increase to $2.45 billion in fiscal 1955 from an estimated $2.4 billion in fiscal 1954.

Other budget highlights:

• **Machine tool reserve.** No new money was asked. The Administration asked $500 million for fiscal 1954, but largely because Defense Secretary Charles Wilson was unenthusiastic about this program to build up the industrial mobilization base, it was trimmed by Congress to $250 million. The budget shows

Proposed Airpower Allocations for 1955

Under President Eisenhower's proposed budget, this is how the services plan to obligate funds in selected aviation categories in the 1955 fiscal year, which starts July 1, compared with previous years.

Air Force

	1953 Fiscal (actual)	1954 Fiscal (estimated)	1955 Fiscal (proposed)
Aircraft, engines, parts, procurement	$8,971,274,982	$5,020,006,498	$3,965,615,000
Guided missile procurement	243,589,369	678,449,741	466,521,000
Industrial mobilization	5,975,130	13,419,505	15,000,000
Avionics and communications equipment procurement	308,093,460	435,236,569	401,108,000
Training equipment procurement	71,641,378	79,106,205	33,540,000
Research and development	481,563,914	532,843,188	431,000,000
This includes:			
(a) Aircraft	46,721,988	64,689,975	33,728,000
(b) Guided missiles	129,724,984	84,742,676	91,719,000
(c) Propulsion	65,880,949	77,980,148	80,276,000
(d) Avionics	75,646,891	78,786,082	57,643,000
(e) Armament	20,699,246	70,184,008	33,156,000
(f) Equipment	25,464,812	33,255,119	25,021,000
(g) Sciences	48,455,974	43,989,506	32,626,000
(h) Special projects	12,726,143	12,973,474	8,721,000
(i) Laboratory operations	56,242,927	66,242,200	68,110,000
Continental construction	553,078,694	581,895,140	314,600,000
Overseas construction	744,566,818	803,431,148	290,400,000

Naval Aviation

Aircraft, engines, parts, procurement	$2,937,229,386	$1,597,385,715	$1,880,000,000
Guided missile and target drone procurement	114,031,448	141,792,000	60,000,000
Guided missile outfitting	15,059,641	8,218,000	10,000,000
Training equipment procurement	7,378,261	10,979,000	6,800,000
Aircraft modernization	18,380,935	53,335,000	40,200,000
Research and development	173,901,885	157,728,000	147,149,000
Industrial mobilization	4,661,180	2,016,000	5,618,000

Army

Ammunition and guided missiles	$2,505,431,556	$844,693,000	$990,000,000
Air defense and research and development	39,037,478	36,060,000	28,523,000

Funds for Airpower

Money Requested

	1953 Fiscal	1954 Fiscal	1955 Fiscal
Air Force	$22,081,671,690	$11,416,896,000	$11,206,000,000
Naval Aviation	4,853,042,000	2,322,000,000	2,958,000,000
Total	$26,934,713,690	$13,738,896,000	$14,164,000,000

Expenditures

Air Force	$15,267,788,490	$15,461,000,000	$16,194,000,000
Naval Aviation	3,111,529,979	3,300,000,000	3,400,000,000
Total	$18,379,318,469	$18,761,000,000	$19,594,000,000

Aircraft and Related Procurement

Money Requested

	1953 Fiscal	1954 Fiscal	1955 Fiscal
Air Force	$12,684,902,000	$3,495,000,000	$2,760,000,000
Naval Aviation	3,910,042,000	1,379,000,000	1,987,000,000
Total	$16,594,944,000	$4,874,000,000	$4,747,000,000

Expenditures

Air Force	$6,437,880,057	$6,900,000,000	$6,700,000,000
Naval Aviation	2,167,093,060	2,400,000,000	2,450,000,000
Total	$8,604,973,117	$9,300,000,000	$9,150,000,000

Civil Aeronautics Administration

Following is a breakdown of the $180.6 million the Administration requests for fiscal 1955 for CAA and CAB.

New Money Requested:

	1953	1954	1955
Salaries and expenses	$105,594,000	$104,835,000	$96,450,000
Establishment of air navigation facilities	13,591,499	7,000,000	5,000,000
Technical development and evaluation	1,162,972	750,000	700,000
Federal-aid airport program	14,321,154	.....	.....
Liquidation of contract authorization, federal-aid airport program	9,000,000	22,700,000	.....
Maintenance and operation of Alaskan public airports	433,594	500,000	650,000
Air navigation development	1,750,000	1,085,000	1,085,000
Maintenance, operation, construction Washington National Airport	1,378,000	1,750,000	.....
Claims, Federal Airport Act	1,821,423	.....	.....
Total, Civil Aeronautics Administration	$149,052,642	$138,620,000	$103,885,000

Civil Aeronautics Board

Salaries and expenses	$3,800,000	$3,777,000	$3,770,000
Payments to air carriers	.....	60,491,250	73,000,000
Total, Civil Aeronautics Board	$3,800,000	$64,268,250	$76,777,000

that none of the $250 million will be spent this year, and only $100 million is planned for spending in fiscal 1955.

• **Guided missile** procurement programs of Navy and USAF will be curtailed sharply. Estimated obligations of the two services in fiscal 1954 of $820 million will drop to $526 million.

• **Research and development** programs of USAF and Naval Aviation also will be substantially curtailed. The estimated total obligation of $690 million this year will be reduced to $578 million in fiscal 1955.

► **Civil Aviation**—Increasing de-emphasis on the promotional responsibilities of the federal government in civil aviation, reported by AVIATION WEEK (Dec. 14, p. 14), is a principal theme in the fiscal 1955 request.

Civil Aeronautics Administration requested $34.7 million less for 1955 than in fiscal 1954; Civil Aeronautics Board's request for 1955 was raised $12.5 million over 1954 for air carrier subsidy payments.

CAA expenditures in fiscal 1955 are estimated to be $25 million less than in 1954 and $40 million less than 1953.

► **Re-evaluation Asked**—"Increasing maturity of this industry requires thorough re-evalution of the promotional responsibilities of the federal government," the President said in his message.

"With growing maturity, the airline and aircraft industries should assume increased responsibility for air safety. Improved procedures of traffic control, elimination of older-type facilities, and curtailment of less essential services should permit an expanded volume of air traffic to be handled safely with reduced federal expenditures for operating programs.

"In addition, the time has come when consideration should be given to requiring the users of the airways facilities to share the costs (AVIATION WEEK Nov. 2, 1953, p. 71) of providing this service."

► **Mail Subsidy Transfer**—A request was made for $5 million to permit further work on navigation aids.

"Pending completion of current studies, no provision is made in the budget for additional appropriations for grants to state and local government units for airport construction," Eisenhower said.

". . . Transferring the subsidy portion of airmail payments from the Postmaster General to the Civil Aeronautics Board makes it possible for the first time for Congress to consider this major aid to aviation as a separate budget item. For both 1954 and 1955, these subsidy payments are estimated at approximately $80 million, based primarily on existing route patterns and mail rates.

"The subsidy expenditures were included in the Post Office Department through September 1953. The separation of compensatory mail payments, which remain in the Post Office, from subsidy payments is a necessary first step toward a more effective review of expenditures for civil aviation as well as for the postal service."

Lockheed Shifts New Missile System Group

Burbank, Calif.—Lockheed Aircraft Corp. is transferring its new Missile Systems Division to the company's Van Nuys, Calif., facilities.

Lockheed jet trainer operations are being shifted from Van Nuys to Palmdale, Calif., partly as a result of public complaints about operation of jets over residential areas (AVIATION WEEK Sept. 28, 1953, p. 22).

► **Engineering Chief**—The company also discloses appointment of Willis M. Hawkins as chief engineer of the new Missile Division. Formerly chief preliminary design engineer of Lockheed's California Division, Hawkins has been in charge of pilotless aircraft research for the past few years. He joined Lockheed in 1937 as a designer on the Model 14 and the P-38.

The Missile Division, formed two months ago, has been headquartered at Lockheed's Burbank plant. Shop work already is under way at Van Nuys, and the division's management and engineering staff will move to permanent headquarters there as facilities become available.

Elwood R. Quesada, division vice president, says the move will be completed by July 1.

► **Regrouping Elements**—When the division was formed in November, Lockheed president Robert E. Gross reported that "important recent developments made it mandatory to regroup elements of the various departments into one division which can expand at once into all fronts of missile systems research and development."

The Lockheed announcement carefully distinguishes between pilotless aircraft and guided missiles. The new division will work in the design, development and production of both.

Lockheed announces these other appointments in the Missile Systems Division: I. H. Culver, manager of engineering experimental design, H. J. Brown, director of financial operations, and H. M. Porter, director of industrial relations.

AA Sets 3.3-Billion Passenger-Mile Mark

American Airlines, flying 3.3 billion passenger-miles in 1953 for a 13.2% increase over the 2.9-billion total of 1952, became the first domestic airline to top the 3-billion-mile mark in one year.

Aircoach travel accounted for 17.7% of the total, compared with 13% for 1952. Aircoach passenger-miles increased 49.5%, while standard fare traffic gained 7.8%.

Load factor dropped from 72.5% in 1952 to 67.7% for 1953. American reports the decrease resulted from increase of 21.4% in passenger capacity, measured in seat-miles.

► **Aircoach Change**—Increased capacity stems from introduction of DC-7s, conversion of more DC-6s from 54-passenger standard configuration to 80-passenger aircoach plus increased schedules.

Airfreight continued to show biggest gain of all categories of traffic, with an increase of 16.5%, rising from 46,898,000 ton-miles in 1952 to 54,659,000 in 1953.

Mail ton-miles remained virtually the same: 17,566,000 in 1953, compared with 17,564,000 in 1952.

► **Mail Experiment**—American also carried 636,428 ton-miles of first-class mail between New York-Chicago, Washington-Chicago in the Post Office Department experiment that began on Oct. 6, 1953.

The carrier also ran up a total of 10,282,000 ton-miles in Air Express shipments, an increase of 3.5% over 9,938,000 in 1952.

Operating factor also improved as American completed 98.5% of its scheduled flights, compared with 97.7% in 1952.

Aircraft Industry Holds Bulk Of Military Contracts

U. S. companies with the largest volume of military contracts are 19 aircraft manufacturers or important producers of aircraft engines or avionics. These firms hold more than 42% of the total of $98,723 million in military contracts awarded from July 1950 through June 1953.

Following are firms engaged in aircraft or related production included in the Defense Department's listing of the 100 companies with the largest volume of military contracts:

Rating	Firm	Volume of contracts (In millions of dollars)	Percent of total military contracts
1	General Motors Corp.	$7,095	7.2
2	Boeing Airplane Co.	4,402	4.4
3	General Electric Co.	3,459	3.6
4	Douglas Aircraft Co.	2,867	2.9
5	United Aircraft Corp.	2,816	2 8
6	Chrysler Corp.	2,199	2.2
7	Lockheed Aircraft Corp.	2,152	2.2
8	Consolidated Vultee Aircraft Corp.	2,072	2.1
9	North American Aviation	1,931	2.0
10	Republic Aviation Corp.	1,877	1.9
11	Curtiss-Wright Corp.	1,746	1.7
12	Ford Motor Co.	1,604	1.7
13	American Telephone and Telegraph Co.	1,491	1.5
14	Westinghouse Electric Corp.	1,348	1.3
15	Grumman Aircraft Engineering Corp.	1,043	1.1
16	Northrop Aircraft	999	1.0
17	Bendix Aviation Corp.	940	1.0
18	Sperry Corp.	925	0.9
19	Kaiser Motors	897	0.9
21	McDonnell Aircraft Corp.	679	0.7
23	Glenn L. Martin Co.	643	0.7
25	Hughes Tool Co.	622	0.6
27	Studebaker Corp.	581	0.6
28	Bell Aircraft Corp.	504	0.5
29	Avco Manufacturing Corp.	455	0.5
31	Goodyear Tire & Rubber Co.	440	0.5
32	Packard Motor Car Co.	439	0.4
33	International Telephone and Telegraph Corp.	430	0.4
38	Fairchild Engine and Airplane Co.	371	0.4
48	Continental Motors Corp.	259	0.3
54	Beech Aircraft Corp.	215	0.2
55	General Tire & Rubber Co.	211	0.2
58	Piasecki Helicopter Corp.	209	0.2
62	Rheem Manufacturing Co.	187	0.2
84	Gilfillan Brothers	130	0.1

Douglas Studies Copters

Douglas Aircraft Co. is investigating commercial possibilities of building a large helicopter to replace its DC-3, may produce a 40- to 60-passenger rotary-wing transport if studies show it economically suitable for local service airlines.

Bypass Engine Best For Carriers: Furnas

The bypass engine or ducted fan will be the key powerplant in the commercial transport picture by the 1960s, predicts C. C. Furnas, director of Cornell Aeronautical Laboratory, Inc.

Furnas presented his forecast of future aviation trends last week at the Wings Club in New York. In the next two or four years, turbojet and turboprop engines will be flying in American passenger planes, he said, but the bypass engine, which combines some of the best features of both, ultimately will outstrip them.

Other predictions which were made by Furnas:

- **Transport speeds** for medium to long hops will be in the 550-600-mph. range. Supersonic speeds will be possible, but uneconomical.
- **Nuclear powerplant** will be flying in large military aircraft within 25 years. But the huge mass and the ticklish radiation-shielding requirements will bar atomic engines from commercial transports.
- **Combat speeds** will level off, perhaps in the next military design competition, and then will drop, as the emphasis shifts to optimum performance rather than miles per hour.
- **Missiles** are "essentially stupid," no matter how much electronic gear they carry, so the pilot still will be required to provide the quality of judgment, even though the new devices may make him "somewhat obsolete." Missile performance will be governed by performance of the aircraft that carries them into combat.
- **Commercial convertiplanes** seem impractical, since design compromises necessary to combine vertical lift and high cruising speed with practical payload are too severe.
- **Reliability and safety** of commercial air travel will increase as a result of better and more electronic gear; improved design of aircraft; better knowledge of aerodynamics, structures and materials; new types of engines, and use of rotary-wing aircraft.

Comfort will be improved as practical gust alleviators are introduced, aircraft design is bettered, and through use of high-altitude flight and adaptable flying patterns for optimum weather. Completion of scheduled flights will rise to more than 99%.

- **Rotary-wing craft** will cut home-to-home or office-to-office traveling time, although block-to-block speeds may be lower than now.
- **Private flying** for specialized uses, such as crop dusting or prospecting, will increase, but for the "average Joe in his everyday chore of living" the flying picture is not bright.

Bell XV-3

Convertiplane being developed by Bell Aircraft Corp. has been designated the XV-3, first official use of the letter "V" as an Air Force designation.

Previously, convertiplanes were listed under the general helicopter classification "H."

The XV-3 is a tilting-rotor type aircraft with rotor-propeller combinations mounted on wings. These act as helicopter rotors on takeoffs and landings and, after the aircraft attains cruising speed, are tilted forward to operate as conventional propellers.

The aircraft is being developed at Bell's Helicopter Division at Ft. Worth, Tex. Another contractor developing military convertiplanes is the McDonnell Aircraft Corp., St. Louis.

AF MiG Story Omits Altitude Superiority

(McGraw-Hill World News)

Tokyo—Far East Air Forces' report on tests of the fugitive MiG-15—calling the Russian-built fighter generally inferior to the F-86 but failing to point up its high-altitude superiority—does not tell the whole story.

While everything released by FEAF with USAF approval is true (AVIATION WEEK Oct. 26. p. 14), an evaluation of the MiG-15 is not complete merely with an assessment of its dogfighting characteristics against the Sabre.

The Red aircraft was not designed for a fighter war but for defensive action against our bombers. Nothing in the FEAF release touches on this role or the probable edge the MiG holds with its fast rate of climb and high-ceiling performance.

► **Emphasized Need** — Reports that USAF F-86 Sabres and Navy F2H Banshees have a hard time tackling B-36s at altitudes higher than 45,000 ft. emphasize the need to know more about the MiG-15.

Sabres should win the majority of dogfights with the Communist jet at any altitude where the F-86 can fight. But top ceiling for the Sabre is 50,000 ft., where it "staggers."

Stripped clean, the Sabre has some maneuverability at 48,000 ft., leaving only a 3,000-ft. layer of atmosphere to intercept bombers attacking at altitudes above 45,000 ft.

Experienced U. S. combat pilots say MiGs maintain creditable formations at approximately 55,000 ft. If their estimates are correct, the MiG has a significant superiority over our fighters and bombers.

► **Little Comfort**—Nothing in FEAF's evaluation of the MiG contradicts this view, nor does it serve to comfort bomber pilots who may head for Communist targets in the future.

Furthermore, the MiG-15 tested by FEAF was built in late 1951. In the spring of 1952, Russian air force leaders held a high-level conference in Moscow to study deficiencies uncovered in Korea.

Their test pilots may have found out at that time what FEAF's evaluation discovered last fall.

McCarran Raps CAA Safety Personnel Cuts

Civil Aeronautics Administration's efforts to cut down expense by reducing regional aviation safety positions has run into opposition from Sen. Pat McCarran, ranking minority member of the Senate Commerce Appropriations Subcommittee.

Formerly three branch agents—for general, air carrier and aircraft engineering safety—reported to a regional aviation safety chief. Now they report directly to the regional administrator.

The former plan was put into effect in 1951 at the urging of the Commerce Appropriations Subcommittee, headed by McCarran at that time.

► **Chiefless Department**—"Elimination of the position of Aviation Safety Division chief gives us a situation analogous to having a police department with a homicide division, a robbery and bunko division, and a traffic division, with no police chief, and then expecting the city manager or mayor to keep the show on the road," McCarran declares in a letter to CAA Administrator Fred B. Lee.

"It can be done, but why do it when there are better ways. The money savings will be of negligible importance."

► **Questionable Merger**—He also objected to combining the general and air carrier safety branches, a merger that has been under discussion at CAA.

McCarran declares CAA safety personnel have been told, in effect: "If you want to find out how an airline is doing, ask its management. They know the answer better than anyone."

Skeptical of wholesale return to industry of responsibility for safety, the senator observes: "I have felt for some time that CAA has been leading industry around by the nose too much and can relax in some areas with some carriers and other specific segments of industry.

"I do not believe that everyone is so ready and willing to assume all this new responsibility that CAA should abandon its safety mission. . ."

Airlines Set Uniform Penalty for 'No-Shows'

In their first unanimous attempt to lick the costly "no-show" passenger problem, the scheduled airlines beginning Mar. 14 will refuse to refund full ticket value to an aircoach passenger who fails to cancel his reservation by three hours before flight time.

If the policy succeeds with aircoach, the airlines plan to extend it to regular fare services.

So far, this is an experiment on domestic routes only.

▶**20% Penalty**—The charge will be 20% of the value of the ticket. The other 80% will be refunded.

The no-show penalty applies to the ticket on the embarking airline only, does not include the value of a passenger's connecting ticket on other carriers farther along the route. It also does not apply to the latter part of a one-airline ticket if the reservation includes a stopover at a city along the route.

Minimum charge for failing to cancel an unused reservation before the three-hour limit will be $5.

▶**CAB Approval**—The Air Traffic Conference of America passed the first uniform resolution on the no-show fine last summer, then amended it twice. ATCA submitted the present version last November for Civil Aeronautics Board approval, and it was granted last week.

Almost all the coach lines already have varying degrees of penalty for no-shows, with at least one major carrier charging the full value of the ticket. This will be their first uniform rule on the problem.

The requirement of cancelation notice three hours before departure time is not a "punishment," Air Transport Assn. notes.

The new policy merely recognizes that paying passengers are lost not necessarily at the last minute but throughout a period of several hours before flight time, if the flight has been fully booked in advance.

U. S. to Arm Europe With B-61 Squadrons

Air Force Secretary Harold E. Talbott has revealed that two Martin B-61 Matador squadrons will be sent to West Germany this year, despite USAF denials last month of plans to deploy guided missiles abroad (AVIATION WEEK Dec. 7, p. 9).

The pilotless bombers are being based in Germany, rather than England as first planned, to put them within range of Russian targets.

Defense Secretary Charles E. Wilson says it is a move to make newer weapons available to strengthen West European defenses, and denies the transfer will mean a reduction in U. S. ground forces in Europe.

First Matador unit was activated in 1951 at the USAF Missile Test Center, Cocoa, Fla.

The pilotless weapon is produced by the Glenn L. Martin Co., Baltimore, Md.

Defense Reviews Navy Censorship

Changes to liberalize Navy's drastic security instructions (AVIATION WEEK Jan. 18, p. 15) appeared certain last week as Defense Department started an "intensive review" of the directive to eliminate "faulty language."

Action came promptly after AVIATION WEEK's exclusive article was shown to Fred A. Seaton, Assistant Secretary of Defense for Legislative and Public Affairs. Seaton called in Rear Adm. Apollo Soucek, chief of the Bureau of Aeronautics; the Navy security officers who wrote the directive; Herschel Schooley, director of Defense Office of Public Information; and defense security review officers, for discussions.

▶**Directive Defended**—Adm. Soucek defended the Dec. 7, 1953, directive as a sincere attempt to carry out President Eisenhower's executive order. The instructions were for field guidance.

Schooley stated: "The entire directive is undergoing intensive review. Where there are areas of encroachment in letter or intent on the President's order, they will be changed and the faulty language eliminated or revised."

▶**USAF Model**—The revised order probably will be modeled after Air Force Regulation 70-20, which has been in effect for two years and has worked successfully. There is no plan to write a new Air Force regulation at this time, security officers said.

Certain to be eliminated is the first sentence of Section 9, which states:

"The declassification of information does not constitute authority for its public release."

Other sections will be "clarified" to permit newsmen the same prerogatives in covering stories that had existed prior to the Dec. 7 directive.

IAS Panel Forecasts Business Flying Gains

Symposium on business airplanes, held by the Detroit section of the Institute of Aeronautical Sciences and Aero Club of Michigan, forecasts an important expansion of company-owned executive aircraft operation in the future.

The panel also reiterated the acute need for a plane designed exclusively for executive use (AVIATION WEEK Nov. 9, p. 18).

Participants in the panel discussion, attended by 250 persons: E. T. Peabody, director of General Motors' air transport section; W. T. Piper, president of Piper Aircraft Corp.; Jerry Francis, Beechcraft distributor and owner of Francis Aviation; T. R. Smith, vice president of Aero Design & Engineering Co.; and Lee Renshaw, divisional sales manager for Cessna Aircraft Co.

Chairman and moderator was Peter Altman, vice president, Continental Motors Corp.

Piasecki Transporter Finishes Flight Tests

Tiedown tests will start soon on Piasecki Helicopter Corp.'s YH-16 Transporter (AVIATION WEEK Sept. 28, p. 16) with completion of more than two months of flight tests in which the aircraft reached forward speeds in excess of 90 knots.

Pilots say the copter has good flying qualities, including acceptable stability and control, the company reports.

The YH-16 carried a ton and a half of instruments in its 78-ft. fuselage during the flight tests.

Takeoff gross weight of the copter is more than 15 tons.

▶**No Abnormal Stresses**—Instruments recorded stresses on the fuselage, rotors, transmissions and blades, and other data was collected during the trials on engine performance, control forces and vibration levels.

No abnormal stress levels have been found, Piasecki engineers say, and information gained from the tests will be used in the design of future production aircraft.

▶**More Powerful Version**—The program of 50 hr. of tiedown testing will take several months.

The 40-passenger helicopter was built for USAF.

A second, more powerful version of the craft, the YH-16, powered by Allison turbine engines, now is under construction at Piasecki's Morton, Pa., plant.

SIKORSKY XHR2S-1, which will be available to airlines as a 35-seat transport late in 1956, is Marine Corps' latest assault copter.

Sikorsky Offers HR2S Copter to Airlines

By Robert Hotz

Bridgeport, Conn.—A major step in helicopter progress was revealed last week by the Sikorsky Division of United Aircraft Corp. with the first public showing of its twin-engine XHR2S-1.

The twin-engine copter, featuring a single five-blade rotor, is about the size and gross weight of a Douglas DC-3 and is expected to pioneer a new era in both military and commercial helicopter operations. Its dual prospects:

• **Military.** Marines plan to use the HR2S as an assault transport in their new tactic of vertical envelopment, to be employed with the offensive use of tactical atomic bombs (AVIATION WEEK Sept. 14, p. 17).

The HR2S will carry two squads (26 men) of combat-equipped Marines over distances up to 200 mi. at a speed of more than 150 mph. It also can carry a 105-mm. howitzer and up to three lightweight jeeps.

Army also is interested in the HR2S as both an assault and transport helicopter and is contributing money to further development of this type.

• **Commercial.** Sikorsky sales manager J. E. Beighle sent a letter to the airlines last week announcing that the S-56, a commercial version of the XHR2S would be available for delivery late in 1956.

The S-56 would eliminate some of the purely military features of the HR2S—such as folding tail, integral cargo loading equipment and clamshell nose doors. It probably will handle a comfortable load of 35 passengers over the same range and speed as the military version.

TWIN-ENGINE PODS, on either side of fuselage, house 1,900-hp. P&WA R2800s.

► **Strong Bid**—Sikorsky is building a new 500,000-sq. ft. plant in nearby Stratford, Conn., to handle production of military and commercial versions (AVIATION WEEK Nov. 9, p. 11).

The new plant will double Sikorsky's production facilities and add about 3,000 employes. It also will give the division an opportunity to make a strong bid to consolidate its current leadership in the helicopter transport field by continuing production of commercial 8-10 passenger S-55s and offering delivery in quantity within four to six months of order dates.

Originally, Sikorsky planned to phase out the S-55 this year to devote its plant to HR2S production. Now the main plant will continue production on commercial S-55s and a new Navy antisubmarine warfare version of this design known as the S-58.

► **Transport Fuselage**—The new Sikorsky helicopter is about 60 ft. long and has a gross weight of 28,500 lb. It features a transport-type fuselage that affords virtually unobstructed usable cargo cubage for its entire length. All non-payload, space-consuming equip-

ment has been housed outside the main cabin.

The cockpit sits on top of the cabin at the front of the fuselage. Rotor assembly and engine gearing also are on top of the cabin. The two Pratt & Whitney R2800 piston engines are mounted in external pods that also house the main landing gear assemblies when retracted.

▶**Mounted at Angle**—The main rotor assembly utilizes five blades of about 45-ft. length manufactured by a process described in AVIATION WEEK (Sept. 14, 1953, p. 11).

Engine installation is one of the most difficult yet tackled in a helicopter. The R2800 double-row piston engines are mounted at an angle to the main fuselage with the crankshaft pointing toward the main rotor assembly. Cooling air coming in through a duct in the leading edge of the stub wings has to be turned through 235 deg. to reach the engine cylinders.

The R2800 normally is rated at 2,500 hp. but was derated to 1,900 hp. for the HR2S installation. As a matter of actual practice no more than 1,725 hp. is being used from each engine due to cooling and gearing problems.

Both engines transmit power to the main rotor and the four-blade tail rotor that is almost as large as the main rotor on early model helicopters. Flight demonstrations of the HR2S with a 6,500-lb. payload indicated that even with the power limitations imposed by installation problems this helicopter has a lively performance. The HR2S also has single-engine performance.

▶**Design Features**—Among other interesting design features of the HR2S:

• **Retractable main landing gear** that tucks into the rear portion of the engine nacelles. Tail wheel casters but does not retract.

• **Folding rotor blades** and tail assembly for handling aboard aircraft carrier elevators and stowage on hangar decks. The entire tail fin and rotor fold forward to rest in a cradle on the dorsal spine of the main fuselage.

Folding sequence of the main rotor involves positioning the blades with one pointed directly aft over the main fuselage. The other four blades fold back into the same position with the two more distant blades sliding in under the two closer ones in the final folded position.

Hydraulic folding system is operated from the cockpit.

• **Stub wings.** There are two sets of stub wings on the HR2S. One supports the engine nacelles and houses engine drive equipment and the engine air intakes.

A large flap-type moving surface has been designed into the trailing edge. The second stub wing looks much like a horizontal stabilizer on conventional aircraft. It helps to unload the main rotor in flight and has an aileron-type control surface used to trim the aircraft in cruising flight.

• **Integral cargo handling equipment.** The military version of the HR2S features hydraulically actuated clamshell loading doors in the nose.

Immediately behind the loading doors, a section of the fuselage floor can be lowered to ground level, making it possible to drive jeeps and other wheeled equipment directly in and out of the cabin.

• **Auto-pilot** and de-icing equipment for all-weather operations.

▶**Three Completed**—Sikorsky has completed three HR2S helicopters. The first prototype was put through a flight demonstration in a stiff gusty wind sweeping off Long Island Sound by Sikorsky test pilots Dmitri (Jimmy) Viner and Jimmy Chudars at varying payloads.

With its heaviest payload of more than 6,500 lb., consisting of three special Marine lightweight jeeps and additional ballast, the HR2S exhibited extremely stable hovering conditions, a relatively fast rate of climb to several thousand feet and light landing.

Viner uses a landing technique of feeling for the ground with the castering tail wheel and then settling in on the main gear.

Igor Sikorsky, engineering manager of the division, indicates that future development of the twin-engine configuration would stick to the single main rotor but use gas turbines as powerplants.

Sikorsky believes the larger the helicopter the stronger will become its dependence on a single main rotor system.

Comet Crash Theory: Fuel Blast

Explosions of air and kerosene vapor in partially filled belly tanks seen as possible cause of two accidents.

By Nat McKitterick
(McGraw-Hill World News)

London—A theory that explosions in partially filled belly fuel tanks may have caused British Overseas Airways Corp. Comet crashes of Elba and at Calcutta is being heard in British aviation circles.

The theory could hold up if current belief that a blast occurred in the stern in the Elba crash is disproved.

The two crashes had these significant common denominators:

• Both occurred without warning shortly after takeoff while the planes were in their climbs. In both cases, all-clear signals had been received by airports from which each had taken off.

• Both jet transports involved were on legs of journeys shorter than the Comet 1's designed stage length: Rome to London is 900 mi., Calcutta to Delhi is about 700 mi.

• In both cases, the belly tank (capacity 2,000 gal.) was not refilled, since for both runs concerned there was more than adequate reserve fuel without it. For stability reasons, Comets take fuel from the wing tanks first; belly tank last. Latter are not pressurized.

▶**The Theory**—These facts have led observers to wonder about the possibility of an explosion in the belly fuel tank. Destruction in the Calcutta crash May 2 was so complete there is little evidence to support this theory.

But medical evidence gleaned from the 15 bodies recovered from the Jan. 10 crash at Elba tends to support the theory:

• All 15 bodies, it is now established, were dead before the Comet hit the water (AVIATION WEEK Jan. 18, p. 16).

• All suffered crushed lower limbs.

• None showed signs of facial distortion or burns, which might have indicated prior warning of the disaster.

▶**Danger Point**—The Comet's kerosene fuel has been acclaimed by the British to be more stable than aviation gas. It is more stable on the ground and at the Comet's cruising altitude of 40,000 ft. But in between, the fuel goes through a danger zone of temperature and pressure.

According to Shell Petroleum, Ltd., the flash point of kerosene at sea level is 38C (100F). At the Comet's cruising altitude, there would not be enough oxygen to make an explosion likely. But at 25,000 ft. the flash point drops to around 25C (77F) and there is enough oxygen to form an explosive mixture.

In the Calcutta crash, the Comet was estimated to have been at about 10,000 ft. when it broke up. In the Elba crash, the Comet was nearer 25,000 ft. In Calcutta, ambient temperature on the ground was estimated at 30C (86F) and there were considerable electrical storms in the flight's path. At Elba, no ambient temperature was ascertained, weather was fine.

▶**Fuel Level**—In both cases, level of fuel in the belly tank would have been such as to allow for potentially explosive mixture of air and kerosene vapor, because in both cases that tank was only partially full.

The question: Was temperature of the tank in either or both cases high enough to make an explosion likely?

Civil Aeronautics Administrator Fred

Lee underlined this danger in a speech last May before the Airport Operators Council in Kansas City.

"Kerosene types (of fuel)," Lee said, "can form explosive mixtures at altitude. This will require special measures to prevent hazard from lightning strike and other sources of ignition."

▶ **De Havilland View**—A spokesman for de Havilland, builder of the Comets, told AVIATION WEEK such a situation theoretically is possible. But he pointed out that required temperatures to make the fuel explosive at each level of altitude were well above anything the Comet reasonably could be expected to encounter.

Location of the belly tank between main sections of the jet liner's center wing section is adequate safeguard against heat transfer from adjacent parts of the fuselage, he said.

Only recovery of the wreckage of the Elba crash from the bottom of the Mediterranean can throw more light on this theory. Degree of disintegration in the Calcutta crash, plus the blurring effect of extensive fire, have made evidence in that instance difficult to find. The Royal Aircraft Establishment at Farnborough has had the recovered Calcutta wreckage under study for more than eight months.

▶ **Comet Flies Again**—Meanwhile, one of the six grounded BOAC Comets resumed crew training flights last week after investigation had failed to disclose any signs of structural weakness. The company grounded the Comets after the Elba crash Jan. 10.

The company hints the planes will be returned to full service shortly if no new evidence on the Elba crash comes to light. But the fact is the decision to resume commercial service is up to the Minister of Transport, not BOAC. And currently, the weight of technical opinion is heavily in favor of keeping the Comets grounded a while longer.

Sir Miles Thomas, chairman of the airline, confirms the general impression that some sort of explosion occurred under the fuselage floor. This has given rise to much talk of sabotage, but crash investigators are not assuming this.

Preparations are being made by the British Navy to salvage the Elba wreckage. Exact location still is not definite and depth of water on the sloping seabed indicates the operation will be difficult. And there is no certainty large pieces of the aircraft still are intact.

Air Academy

- **$175 million to be spent on USAF institution.**
- **First class expected to enter school in 1955.**

Establishment of a U. S. Air Force Academy, blocked for years by tangling over its location and economy pressure, now seems a certainty.

House Armed Services Committee, 26 to 0, approved legislation authorizing it and an initial $26-million appropriation. The total cost now is estimated roughly at around $175 million. The only bottleneck now in prospect is House Appropriations Committee, whose chairman, Rep. John Taber, is inclined to limit the initial outlay to $5 million.

▶ **Military Keystone**—The academy has the solid backing of the President and defense leaders. Congressmen appear agreed not to make its location an issue, although behind-the-scenes pressure from localities and state delegations can be expected. Under the authorizing legislation, the decision on site would be made by the Secretary of Air Force after a study of all possibilities.

"Airpower is the keystone of our military strength," Deputy Secretary of Defense Roger Kyes testified. "In any operation, the cost must be weighed against the potential return to the investors. It is our belief that the return in future leadership will repay the cost of an Air Force academy many times over. . . . We are convinced it will insure greater dividends from our overall defense investment."

Air Force Secretary Harold Talbott pointed out that "we are the only air force of any major power in the world which does not have an institution for the specific purpose of training its Air Force officers—a deficiency of serious import to our national security."

Army and Navy are giving full backing to the Air Force academy. USAF now recruits about 350 of its career officers each year through a 25% allocation of the graduates of West Point and Annapolis. None of the services has been satisfied with the arrangement.

▶ **Sites Considered**—Air Force plans to start off with a temporary academy, located at an existing air base near the site for the permanent academy. The first class of 300 would enter in July 1955, and the second class in July 1956. By July 1957, it is hoped construction of the permanent academy would be far enough along to transfer these two classes and enter the third class there. USAF expects eventually to obtain 600, or 50%, of its annual intake of career military officers from the academy.

The seven locations considered most desirable by a former study group, whose findings Talbott will weigh, were: Camp Beale, Calif., near Marysville; a site near Colorado Springs, Colo.; a site near Madison, Ind.; a site near Charlotte, N. C., and sites near Grapevine, Grayson County, and Randolph AFB, Tex.

First View of New Percival Jet Copter

A prototype of the jet-powered eight-passenger helicopter depicted above in model form is being built by Percival Aircraft, Ltd., under the designation P. 74. Power unit will be a Napier high-efficiency, low-pressure unit. Only data available at present on the P. 74 show that it will have a gross weight of 8,200 lb. and disposable load of 3,330 lb. Cabin is divided into two sections, one with forward-facing seats, the other having rearward-facing seats. Craft has three-blade rotor.

AF, Navy Aircraft Obligations Lag

Air Force and Navy obligations for aircraft and related procurement lagged in November, fifth month of the current fiscal year, Defense Department reports.

USAF obligations during the month totaled $171 million and Navy obligations $11 million.

For the July-November period, obligations totaled $572 million: $305 million by USAF and $267 million by Navy.

On Dec. 1, the two services had more than $7.5 billion in unobligated funds for aircraft and related contracting. This means they would have to average an obligation rate of more than $1 billion a month, almost twice the total for the first five months, for the following seven months to earmark the balance by July 1, end of fiscal 1954.

They said he was too young...

Aviators of world renown had studied the project for years. They favored elaborate equipment, and crews of two or more. They were skeptical when, in February 1927, they heard of the plans of a certain single-minded young man from Missouri.

He made it in May—alone. The man they said was "too young"... the man who had never navigated over the sea...loaded two tons of fuel into an untried plane and took off from a soggy field near New York. He had a compass and a pack of sandwiches. Thirty-three hours later he landed in Paris. Making history.

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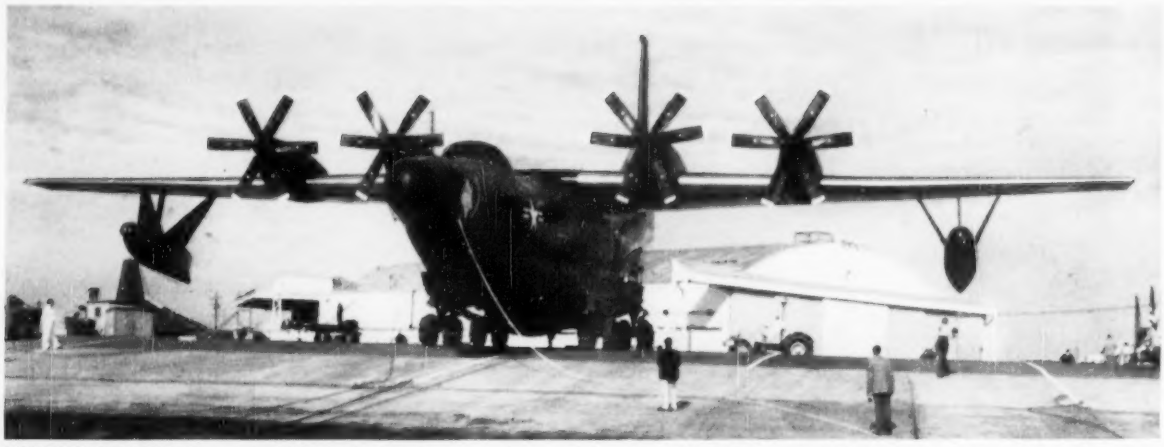


ON THE BEACH, Convair's R3Y Tradewind transport shows off its slim hull, towering single-fin tail and contra-rotating propellers.

R3Y Flight Signals New Seaplane Era

By William J. Coughlin

San Diego, Calif.—When the Navy begins flying its new Convair R3Y water-based transports on trans-Pacific routes this year, it may signal to commercial airlines and airfreight carriers alike that a new era for seaplanes has arrived.

It has become customary to think of water-based aircraft in terms of the lumbering Clippers that blazed Pan American World Airways' routes across the Pacific or the slow Mars flying boats, which drone from Alameda, Calif., to Honolulu on Navy runs.

But the sleek turboprop-powered R3Y Tradewind—scheduled to make its first flight Feb. 15—will outspeed any commercial airliner now flying Pacific routes. Only when the DC-7 begins operating to Hawaii will the airlines have a plane comparable in speed to the Navy's new cargo-passenger aircraft.

► **Essential Ingredient**—"Water-based air transport ruled the world's lanes of aerial commerce for years due to the ability to provide unmatched economy, comfort, versatility, dependability and above all safety," says Convair's hydrodynamic enthusiast, Ernest G. Stout. "Lacking one essential ingredient—speed—these other inherent qualities were compromised in favor of the faster landplane."

Thanks to development of the high-speed blended-hull design with its high-length-over-beam ratio, water-based aircraft now have overcome their lack of speed, Stout points out.

"Water-based aircraft have completely closed the gap in relative speed between the seaplane and the landplane," he says.

► **Traffic Solution**—When Convair launched its first production R3Y-1 for taxi tests on Dec. 17, it called the Tradewind the first new aircraft introduced during the second half century of powered flight (AVIATION WEEK Dec. 28, p. 18).

Its significance may be even greater than that. If Convair's hydrodynamic group is correct, the Tradewind may mark the beginning of a development in air transport that, while still far distant, is inevitable.

The R3Ys builders believe this new seaplane and its jet-powered successors could be the solution to cramped airport locations and crowded traffic patterns.

They have heard the arguments about ice-choked harbors and the folly of cross-country flights in water-based aircraft, and they have the answers for them.

► **Commercial Conversion**—No airlines are knocking at Convair's door yet seeking a commercial version of the R3Y. But the company has underway a study of commercial possibilities of the new water-based transport for passengers and airfreight.

A look at the interior of the new Navy aircraft indicates it might be converted easily for airline use. The Tradewind has a "new look" for seaplanes.

Its spacious comfortable main cabin can seat 80 or more persons or can be used for cargo. The Navy plans to use it for both, fitting it with rearward-facing seats for passenger use.

The cabin is free of the usual bulkheads and other obstructions. This is made possible by the fact that watertight bulkheads blocking the hull off into many cells extend upward only to the floor level.

This multicellular arrangement serves a double purpose.

• **Flood damage control** is provided in the event of forced landing at sea. If the emergency landing is caused by minor failure, repairs can be made at sea and flight resumed.

In the event of a major emergency, the watertight compartments will keep the aircraft afloat until passengers and crew are rescued.

• **Rugged construction** also provides emergency protection for passengers if the aircraft is forced down on land.

"On unprepared terrain it is standard practice for a landplane to make an emergency landing with the wheels retracted," says Stout. "The tough bottom of the seaplane, particularly when equipped with multicellular construction, gives excellent crash protection in such emergencies."

All personnel areas of the Tradewind are equipped with high-altitude pressurization and air-conditioning.

Ahead of the single-deck passenger cabin is the first compartment of the crew's quarters, with three bunks, galley, clothes locker, flight engineer's station and a stairway up to the pilot's and co-pilot's deck.

Forward of the crew's quarters and on the same level is the navigator and radio operator's compartment.

► **Fighter Performance**—The R3Y has a wingspan of some 145 ft., is 142 ft. 6 in. long. Height of its towering single fin tail is 51 ft. 6 in. when on a beaching cradle.

Convair reports that the Tradewind's speed with four Allison T-40 turbo props is more than 350 mph. and performance better than that of World War II fighter aircraft.

Navy security prevents disclosure of more exact performance figures.

Several years operational experience with the Tradewinds will be necessary before commercial feasibility is determined. The Navy in effect is bearing the development costs of a possible commercial airliner or air cargo plane.

IN THE WATER. Navy's cargo-passenger seaplane reveals lines of its highspeed, blended hull design with high-length-over-beam ratio.

"Airlines can't afford the development costs," says one Convair executive. "I think that is the only reason they are not doing anything now."

► **Economic Edge**—Big question to be answered, of course, is that of economics.

Convair believes the cost of building the Tradewinds could be approximately the same, pound for pound, as a commercial airliner of comparable capacity.

"In this size aircraft," says a company spokesman, "the turboprop gives the lowest operating cost. The R3Y should therefore operate at a substantially lower ton/mile cost than its piston-powered competitors."

A Convair designer estimates that the cost per ton/mile for a 150,000-lb. aircraft with jet engines will be the same whether it is land-based or water-based. But as the size increases, the economic margin favors the seaplane.

He adds: "Seaplane potential has taken a rapid acceleration. It is not yet ready to realize that potential because of the lack of experience and demonstrated superiority. But as it shows it has regained its performance disadvantages and is used for specialized purposes by the Navy, its utility will become evident. Then people can figure out its commercial uses."

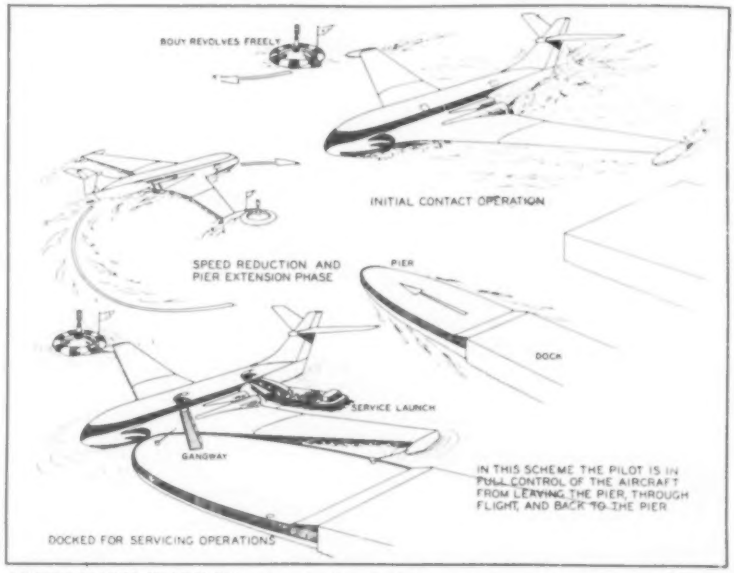
► **Airfreight Potential**—First commercial use of the new water-based aircraft may be for airfreight, rather than passengers.

When airports become congested with jet transport traffic, the first aircraft to be thrown out of the traffic pattern will be airfreighters, warns Convair planner J. R. Dempsey.

"The cargo potential for water-based aircraft already is there," he points out. "While passenger facilities would have to be developed, the major investment for freight already has been made.

"Warehouses and railheads are close to the waterfront and docking facilities already are available. We haven't

JET SEAPLANE design, based on Comet, changes transport's appearance very little.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AUTOMATIC DOCKING of water-based airliners is shown in schematic layout.

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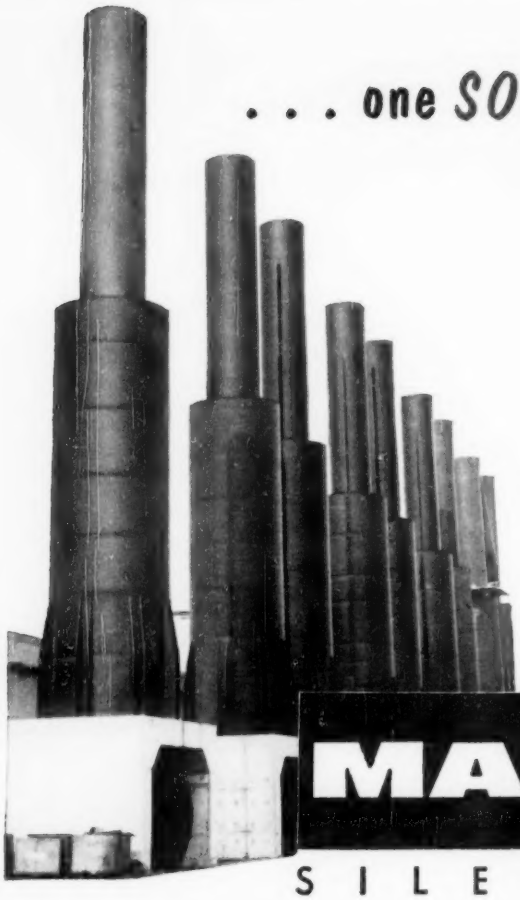

MAXIM SILENCERS

In flight, man has long since left sound behind at speeds that stagger the imagination. Tests and preparation of these powerful engines, however, produce sound levels that man simply cannot accommodate and live with.

Faced with this problem, the aircraft industry turned quite naturally to Maxim, the pioneer and today's unquestioned leader in the science of silencing.

The battery of Maxim silencers above, installed on the production cells of one of the largest manufacturers of jet engines in the United States, make this important testing possible in a location adjacent to a residential area.

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Convair Answers on Sea-Based Jets

San Diego, Calif.—Here are some of the questions frequently asked about water-based air transports, together with Convair's answers:

• What about winter icing of harbors and lakes used by water-based transports?

This would be a problem, but even a runway has to be kept clear of ice and snow. Comparable equipment could keep a lake surface clear.

This is only part of the problem anyway, since approximately 70% of the world's commerce is in the temperate zone.

• What about harbor traffic or submerged floating objects in the landing areas?

Harbor traffic would be less of a problem for water-based jet transports than air traffic for land-based. Maintenance equipment could keep landing areas free of submerged objects at a lower cost than maintenance of conventional airports.

The high bottom pressures on modern hulls automatically prevent all but very large objects from ever coming in contact with the bottom. The very large objects can be seen and avoided.

• What about the safety factor in flying water-based jet transports over lands areas, as in a flight from Los Angeles to New York?

Safety is greater, not less. There are almost no areas in the United States where a water-based aircraft would be out of reach of an emergency water landing zone.

In the type of emergency landing in which a land-based aircraft would set down wheels up, the reinforced hull of the water-based transport would give much greater protection to the passengers.

And speaking of safety, look at the margin in favor of seaplanes on trans-ocean flights.

• Who will take the authority for building terminals for water-based aircraft?

This is a problem yet to be decided, but lower cost of a water terminal makes it much less of a financial strain than the building of new airports or even the expansion of existing ones.

even tapped the surface of air cargo yet and this system is compatible for waterbased airfreight."

▶ **Boat Design**—That is the future that looms for the seaplane, whose development began here in San Diego in 1911 when Glenn Curtiss made the first practical seaplane flight.

Curtiss designed his pusher aircraft as an airplane that would float. But it was not long before water-based aircraft became bogged down in a design philosophy that eventually almost brought their extinction: What started out as an airplane that would float soon became a boat that would fly.

Seaplane design thus fell into the realm of naval architecture and gradually dropped behind in the race for dominance in the air.

Water-based aircraft reached their peak in the 1930's when Sikorsky, Martin, Boeing and Convair flying boats were pioneering world air lanes. But in the battle for speed, these lumbering craft began to fall farther and farther behind.

With the advent of the jet engine, the flying boats were out of the running entirely. Their high drag characteristics made it impossible for them to utilize turbojet engines efficiently.

▶ **New Philosophy**—Then came the birth of the new design philosophy, which was to mean a new life for water-based aircraft. Seaplanes, said certain designers, should not be boats with wings but airplanes that could float. Basic aerodynamic configuration must not be compromised in order to achieve water basing.

Among the leaders in this new movement were Ernest Stout and his hydrodynamic group at Convair.

After a succession of dynamically similar models and the XP5Y-1 prototype, the giant R3Ys are the first production aircraft evolved from that new design philosophy.

▶ **300-Passenger Giants**—Whether water-based aircraft ever will pass land-based transports in performance may depend on whether landplanes eventually become limited by runway length.

Some Convair planners envision giant water-based aircraft which some day would carry 300 or more passengers in ocean-liner comfort.

"Because its size is unlimited by runway requirements, a water-based aircraft always can be more comfortable," comments one designer.

With planes of such enormous passenger capacity, the difference in performance would be zero. Hull requirements would be so insignificant that the two types of aircraft would look almost alike in the air.

Stout and the other Convair specialists have given a great deal of thought to what the next 50 years of flight hold for this new type of aircraft.

Although the Tradewind is turbo-

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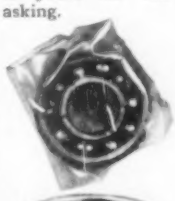

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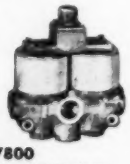

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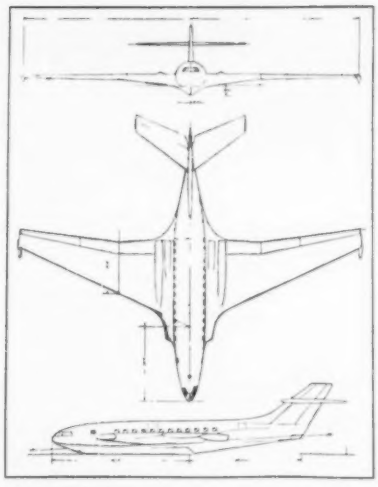


THREE-VIEW of Convair's Comet design.

prop-powered, most of Convair's experts agree that turbojet looks like the best bet for the new-style seaplanes.

With the era of the jet transport rapidly approaching, airlines face many new problems. Convair believes water-based aircraft may hold the solution to some of these.

▶ **Jet Problems**—A top American Airlines executive recently listed reasons the carrier is not ready to buy jet transports. Important among these were:

- **Difficulty of all-weather operation of jets.**
- **Noise problem.**
- **Lack of adequate runways.**

Here is what Stout has to say about operation of water-based jet transports in instrument weather:

"Such operation is greatly enhanced by the use of water-based aircraft due to the wide tolerance usually available

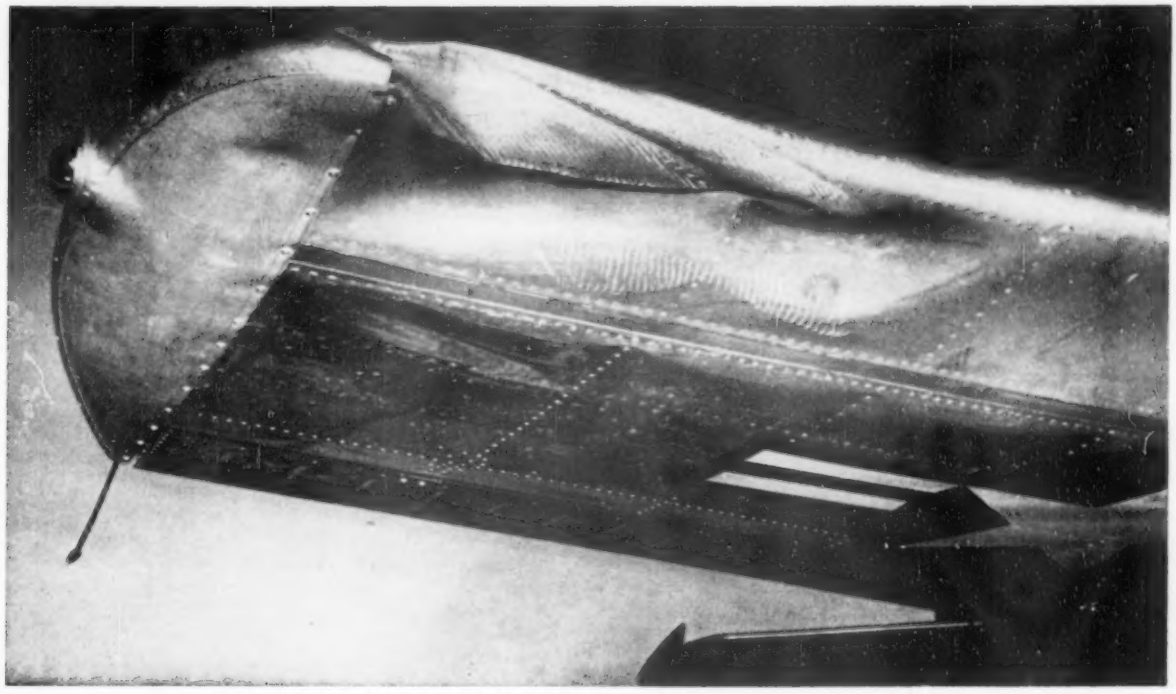
Comet Seaplane

To prove their arguments favoring water-based transports over landplanes, Convair's hydrodynamicists have designed a jet seaplane to the performance characteristics of de Havilland Aircraft's Comet.

Using a blended-hull design and retractable spray dams, the water-basing of the Comet changes its appearance very little.

Jet intakes have been ducted forward into a side entry scoop. Turbine exhaust areas and the horizontal tail have been modified slightly. Wing and frontal areas, payload accommodations, speed and other performance characteristics are the same.

Extra weight of the hull is made up entirely by the elimination of the landing gear and wheel retraction mechanism.



the PLUS factor

All *Beechcraft* airplanes are designed and built to possess *more strength* than is required by government regulations. *Beechcrafts* have a *plus factor* which is intended to provide long life for the airplanes and extra safety for their occupants.

The photograph above shows the right wing of a T-34 (Mentor) *Beechcraft* after it hit an aerial cable in a canyon at full cruising speed. The cable did not break, but almost stopped the *Beechcraft* and spun it around, 350 feet above the canyon floor. The skill of the military pilot was so great that he was able to regain flying speed and control before reaching the canyon floor. The T-34 *Beechcraft* trainer was flown back to its base and made a normal landing. Examination showed that damage was confined to the superficial contusions and abrasions shown in the photograph.

This is another example of the *plus factor* in *Beechcraft* construction.

The Beechcraft T-34 trainer is now in production for the U. S. A. F. and the military services of friendly foreign governments.

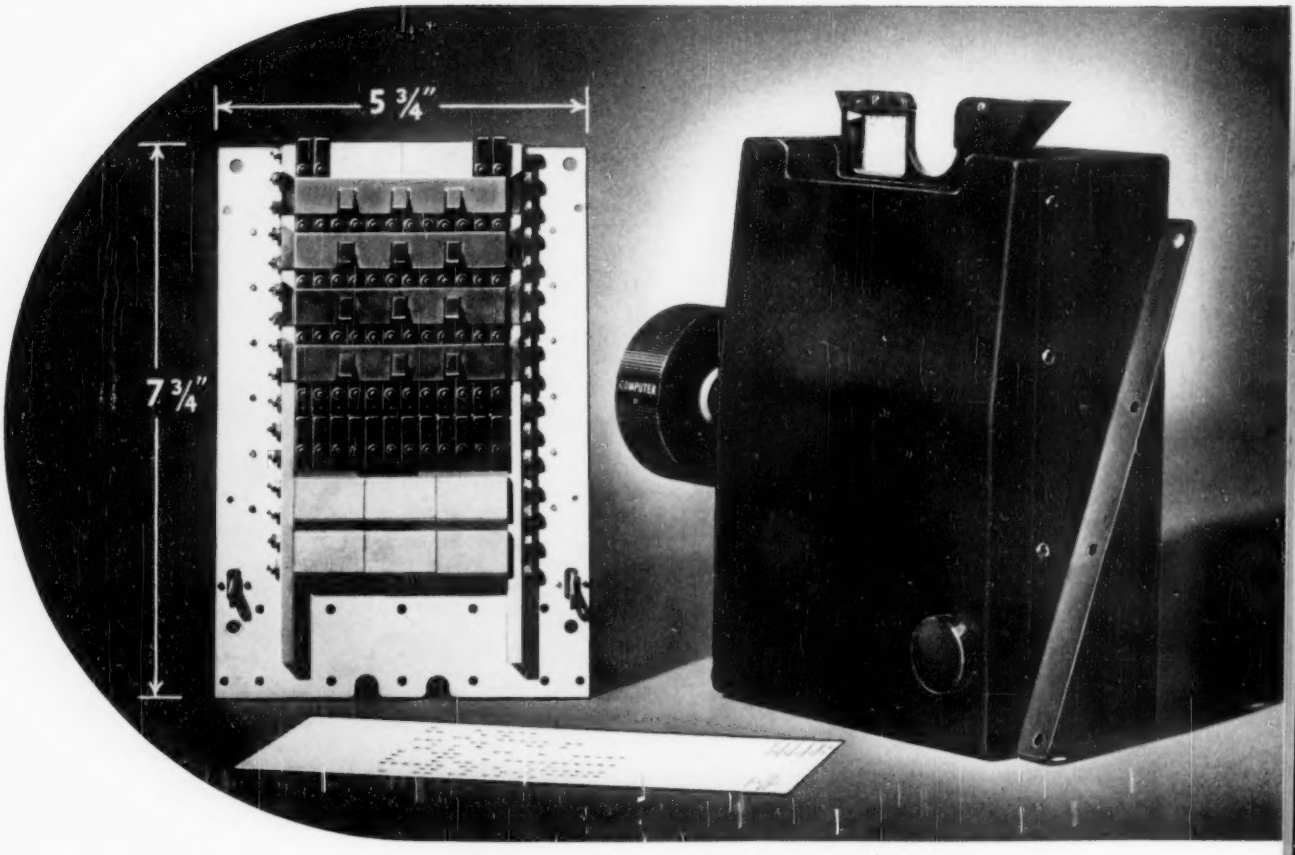
Beechcraft

Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

Beech Builds: USAF T-34A • USAF L-23A • USAF C-45H • USN SNB-5 • Model 35 Bonanza • Model 50 Twin-Bonanza • Model 18 Executive Transport

MICRO Precision Switches

A penny's-width long, the MICRO Subminiature Switch



How Collins Radio uses 64 Micro Subminiature Switches in small space in new airborne navigation system

Entire panel on which Collins Radio mounts these 64 Micro subminiature switches measures but 7¾ inches by 5¾ inches.

The panel is enclosed in the Card Reader of the sensational new Collins Navigation System (Type NC 101) which enables a pilot to fly a selected course line to any point he may choose.

The Micro Switches are actuated by holes in punched cards—transferring information from these cards to the computer. This is accomplished by the transfer of electrical impulses which tune the VHF receivers automatically as the card is fed into the Card Reader.

Engineers of Collins Radio Company chose Micro subminiature switches for this important navigation development because they combined small size with the utmost precision and reliability required in such delicately adjusted equipment.

If yours is a design where absolute dependability must go hand in hand with extremely small size, it will pay you to know all about Micro subminiature switches. Fully experienced field engineers, with wide knowledge of aircraft design problems, are located at 16 Micro Switch branch offices. Let them show you how Micro Switches may be the answer to your most difficult switching problem.

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weighing but 1/15th of an ounce, meets exacting aircraft designs

Special Subminiature Switch Assemblies developed to meet specific design needs

Micro Switch subminiature assemblies shown here are but a few of many special assemblies which Micro Switch engineers have developed to meet unusual design requirements. These include special switch actuators (lower left); toggle switch assemblies (upper left); push button assemblies (upper right) and an eight switch rotary selector switch assembly.

The Micro "1SM1" pin plunger subminiature switch, shown in the center, has but 1/15th the volume and weight of the standard Micro Switch. It measures but 25/32" in length and weighs only .004 lb.

for the point of touchdown and heading.

"Precise positioning of a jet aircraft on a runway, both laterally and along its length, is a maneuver requiring the most elaborate flying aids known to the aeronautical sciences.

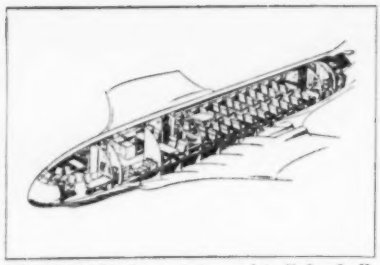
"On the other hand, a simple corner radar reflector attached to a rubber life raft is sufficient for the water-based aircraft where errors in alignment can be measured safely in hundreds of yards."

Stout points out that the pilot of a water-based aircraft has an excellent chance of making a successful landing in an emergency even if no ground aids are available.

"It is an unfortunate and well-known fact that the one thing radar will always pick up is sea-return and bodies of water," he says.

"When all other radar discrimination fails completely the pilot can still find a large body of water which he can rely upon to be relatively free of obstructions—at least infinitely more so than any random area of ground terrain."

▶**Wide Tolerance**—The large airports of the world are totally unsuited for mass transport by jet-propelled aircraft, the Convair designer asserts, and the jet liner cannot tolerate the stacking procedures and traffic control that prevail today.



CUTAWAY shows jet's multicellular hull.

"The wide tolerance available for bringing aircraft in for a water landing in instrument weather allows the jet transport to come straight in and land without stacking," he says.

"Conditions may preclude docking immediately; however, the aircraft and cargo is safely down and the stacking—if it should be called such—occurs on the water in relative safety awaiting turn to tie up rather than land."

Even in heavy weather, visibility close to the surface often is sufficient to allow maneuvering on the water. In extreme conditions, aircraft could be "stacked" on the water over many square miles, according to Stout.

"This may impose some inconvenience to passengers in severe conditions," he says, "but in the same conditions the only emergency areas open to the air-stacked jet-liner are the same unobstructed areas—and they cannot float!"

▶**Lower Minimums**—If water-basing were utilized, weather minimums for jet transports—with no houses under the approach, with precision landings not required—actually could be less, not greater, than present minimums for piston-powered transports, points out another Convair specialist, H. E. Brooke.

The water-based jet obviously would reduce the noise problem since its takeoff and landing approaches largely would be over water.

In addition, in most large cities, the landing areas would be near the commercial districts downtown, not the residential sections.

▶**Cutting Costs**—The multi-million-dollar expense of acquiring land in congested areas for the additional runway length necessary for jet transports would be avoided by water-basing the jets.

"One obvious and attractive solution to this problem," says Stout, "is the utilization of landing strips measured in miles of length rather than thousands of feet and thousands of feet width rather than hundreds of feet, represented by the multitude of water approaches to the great cities of the world."

In addition, it would overcome in many cases another problem arising

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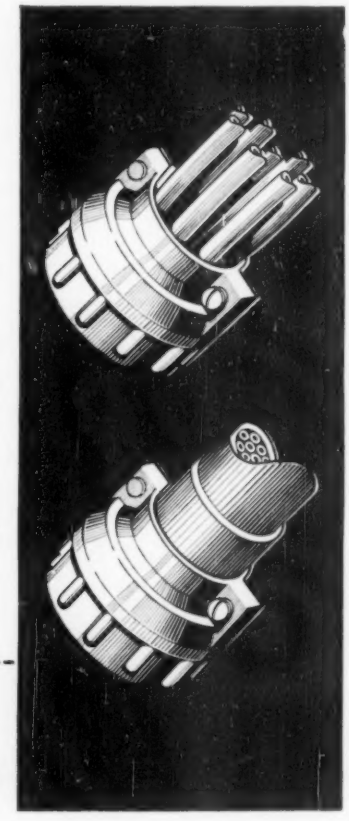

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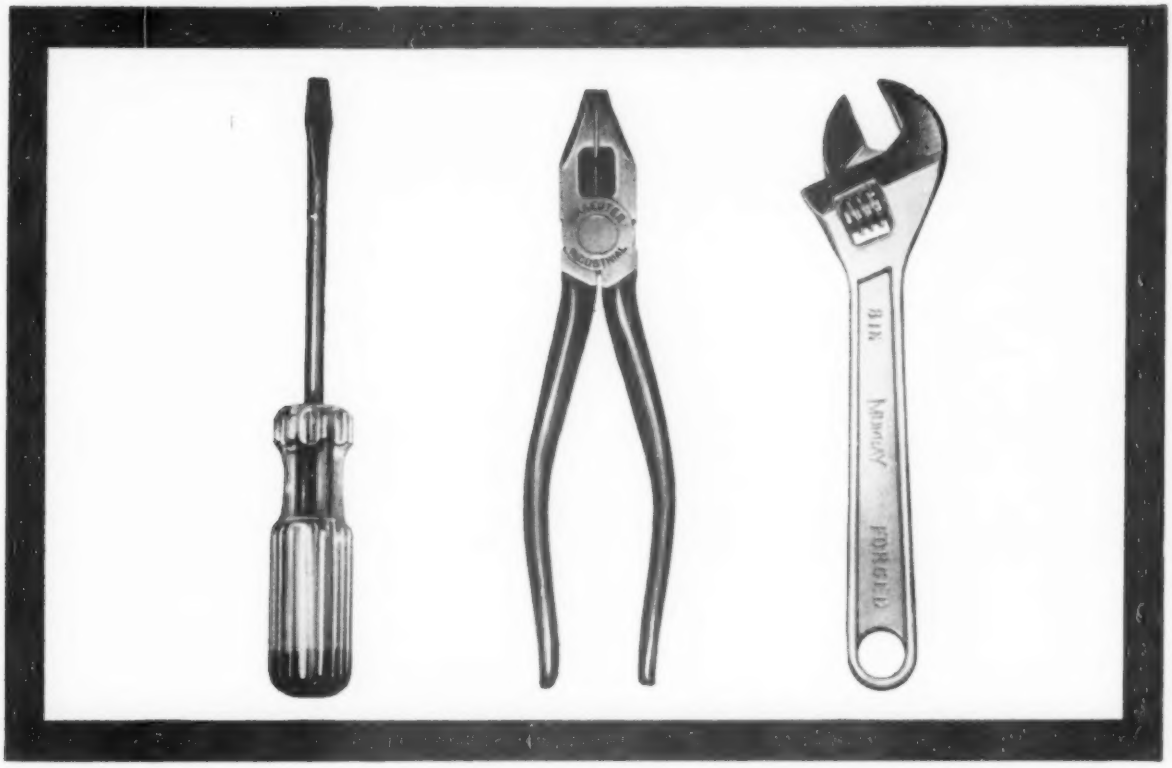

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Here at last is a connector which combines miniature size and self-locking action! To make electrical connections, simply press AMP Taper Pins into mating receptacles. The pins are almost as small as the wire itself, yet when securely inserted will maintain their connection even up to the point of wire failure. Salt spray and vibration tests show initial contact resistances of only 0.5 to 1.0 milliohms increasing to a maximum of 2.63 milliohms after 160 hours of cycling.

New applications are being found every day for these versatile connectors—over a billion pins are in the field in computers and associated business machines alone!

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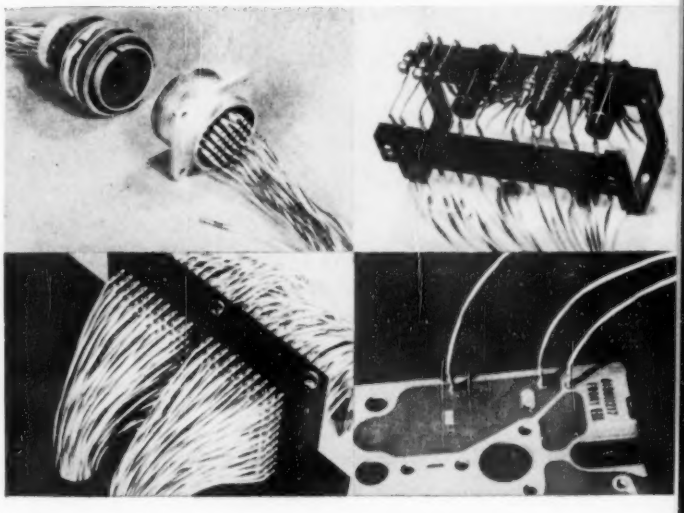

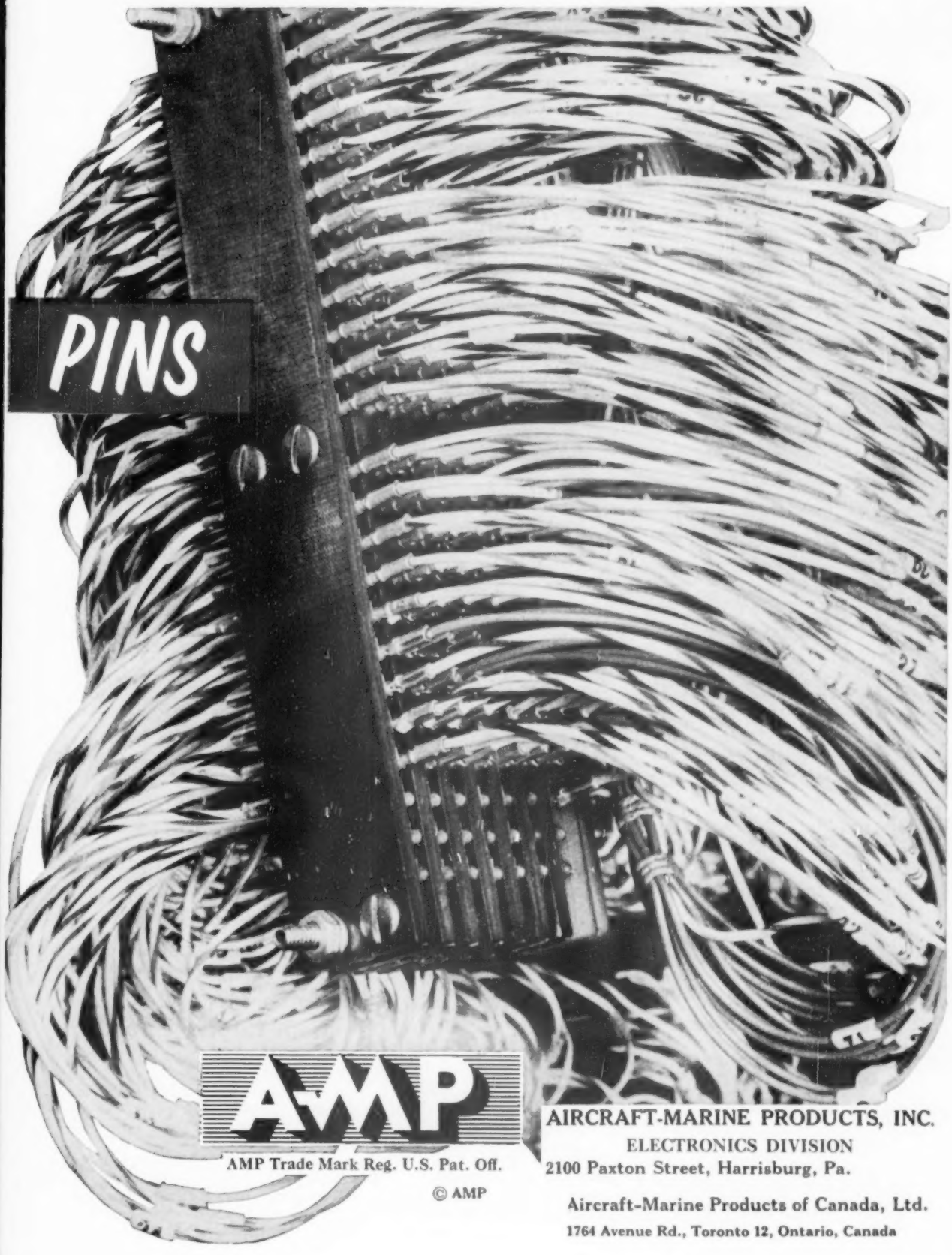

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from the need for more land for longer runways. As airports are forced to greater distances from the cities they serve, ground transportation delays are eating up much of the advantage gained by flying.

In a number of cities, water-based transports could reverse this trend. In New York, for example, water-based jet transports could land in Long Island Sound adjacent to La Guardia Airport and proceed directly to midtown berths.

▶ **Water Terminals**—Stout points out still another advantage of water landing areas: "Local building and population expansion does not close in on these areas with their demand for a cessation of operations or a costly move to a more remote location."

Cost of such a water terminal would be considerably less than that of a comparable land terminal, according to Brooke. He estimates that a fully-equipped water-based facility could be constructed for $50 million, compared with $100 million for a land terminal with equal facilities.

Such a terminal would include passenger and administration buildings, handling and beaching equipment and maintenance facilities such as marine-type railways, floating drydocks, and shop equipment.

▶ **Beaching the Jets**—The pilot of an incoming airliner would taxi into the ramp area between two buoys where, no matter what the wind, he could hook the landing lines.

Then as he was positioned by automatic lines, he would cut his power for handling into a U-dock where passengers would be discharged. There would be no need for boats to come out to help a water-based jet transport, according to Convair experts.

Such a system already has been tested in the design stage.

"Beaching of water-based aircraft is no longer a problem," Brooke says, "and once on the beach it is comparable to land-based."

▶ **Simple by Comparison**—"It is a well-documented fact that many of the difficulties of water-based operation in the past resulted from the lack of efficient docking and handling facilities," comments Stout.

"With the advent of modern airport crowding and confusion, the design of efficient equipment and procedures for the rapid handling of water-based aircraft appears simple by comparison.

"The necessity for dispersion of aircraft away from congested areas is rapidly overcoming the apathy surrounding the development of specific water-based terminals, and many automatic docking schemes promise to be efficient, reliable and vastly less costly than the elaborate modifications and schemes belaboring all modern airport managers today. Automatic contact, positive positioning and rapid servicing can be attained with proper planning and functional design."

Water terminals are more flexible to changing times and air traffic development, Convair specialist Brooke points out.

"Once you lay a concrete runway, that's where it stays," he says. "But a water base with its mobile runway markers can be shifted in a few weeks."

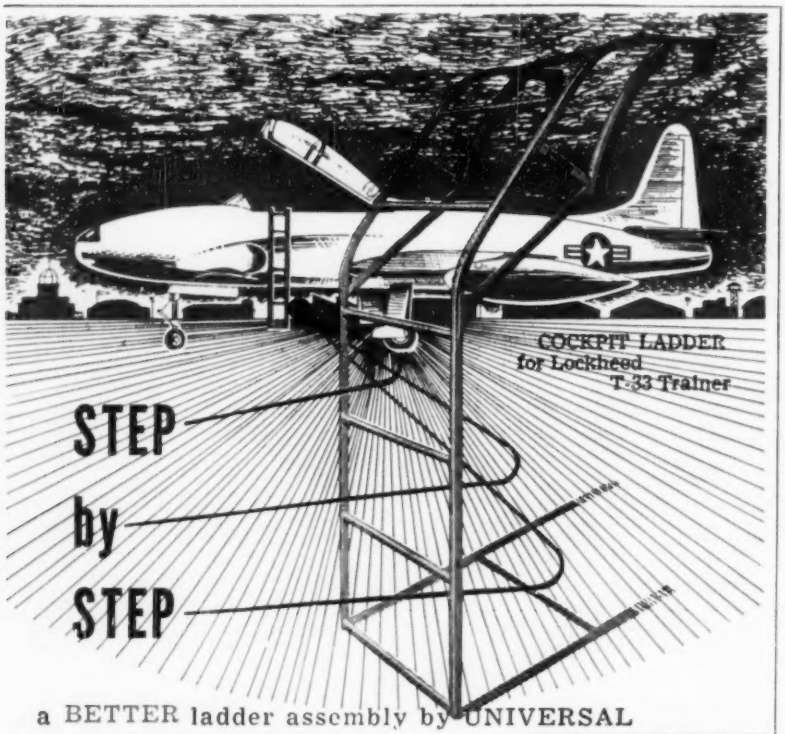
In addition, he asserts that the unlimited ports offered water-based aircraft will increase the rate of usage of air transportation.

This acceleration of air service in turn, will speed up development of isolated areas where transportation now is a bottleneck.

Japan Copter Shuttle

Bell Model 47D-1 helicopter is flying Japan's first airmail shuttle service between Tokyo's Central Post Office and Haneda Airport, and plans call for steady increases of the copter's one-a-day flight schedule.

Japan Helicopter Transport Co. inaugurated the service last month, delivering mail from the Post Office rooftop heliport to Osaka-bound transports at the Haneda field.



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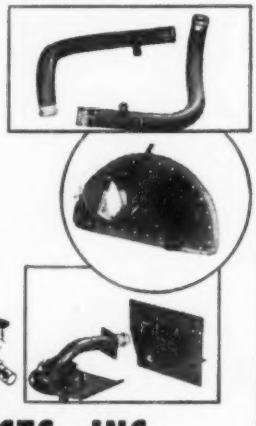

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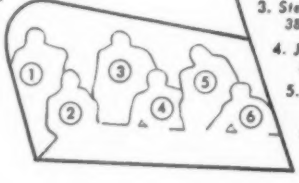

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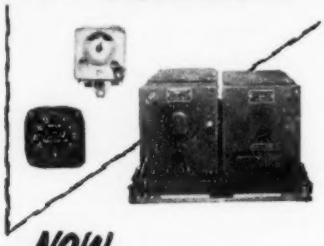

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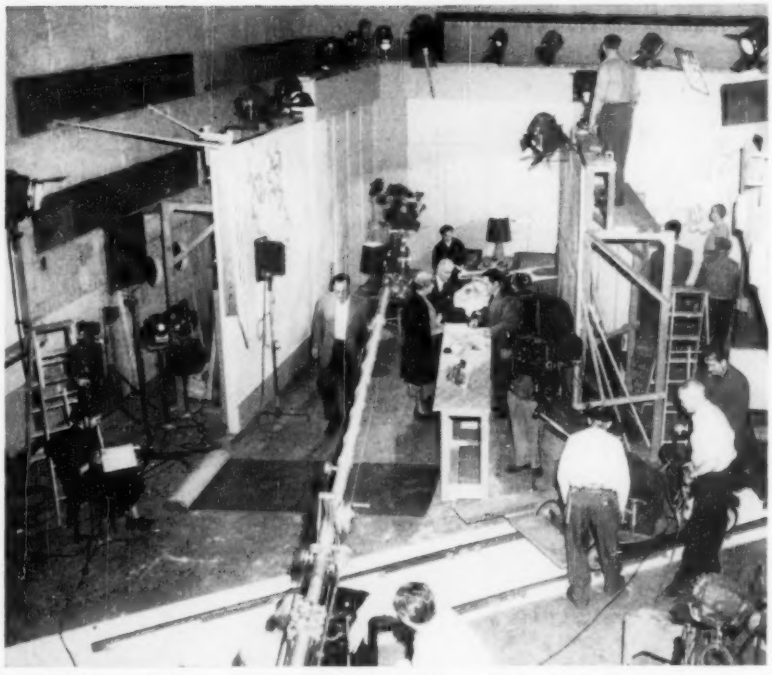


MOVIE SET of ticket counter is used in preparation of PAA sales technique film.

PAA Training Goes Hollywood

By Frank Shea, Jr.

An investment of over $500,000 in an extensive employe training program is paying big dividends in increased sales and efficiency for Pan American World Airways, company officials say.

Claimed to be one of the largest single integrated sales attitude and training programs undertaken in any industry, it is a combination of human relations, job attitude development and technique training—designed to give the average employe in PAA's worldwide network a better basic understanding of the company and its operations.

The "text books" of the program are a series of 15 motion pictures, 10 sound slide-films, four packaged easel presentations and numerous case history recordings. Employes, organized in groups of 10 or 12 according to duties, study these training aids together, and discuss them in relation to their own problems. As much as 10 hours a month are devoted to the program, with classes meeting once or twice a week.

Pan American states that more than 90 stations in its worldwide network are now fully equipped with the aids with more being added each month. Thirty-two of these stations are in Europe alone.

▶**New Perspective**—Upon completion of training, personnel find that they have a new perspective with relation to their duties, the airline says. And, with increased knowledge of operations of all facets of their organization, they are able to integrate themselves with the entire PAA operation in a more efficient, purposeful manner, officials believe.

As a sign of the program's value, PAA points to the interest shown by numerous other companies—including two railroads—in adopting similar plans.

▶**Sight and Sound**—Like any airline, Pan American's stock in trade is service. For this reason, the basis of the program is people: the people who run the airline—and the people who buy the tickets and ship the cargo that keep it running.

Through films and other media, these two groups are introduced to each other. Then they are analyzed. Passengers and prospects are figuratively taken apart on the screen, and their problems and desires laid open for the employe to see, learn to recognize and feel.

The employe, too, is thrown up on the screen, enabling him to get a good clear look at his own problems in dealing with customers. By recognizing and later analyzing them in discussion periods, he returns to his duties better equipped to cope with any situation which might arise, Pan Am believes.

All training periods are run by conference method and include thorough analytical discussion led by employe-trainers especially schooled in conference leadership.

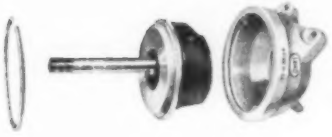
The motion pictures deal with the overall job operation—what it is—who

Add Greater Strength to Lighter Weight...

and take your **PROFIT IN PAYLOAD!**

The New LORD MR-36M DYNAFOCAL ENGINE MOUNTING

FOR R-2800 C ENGINES



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Ask about maintenance cost savings you can enjoy by using Lord Core Renewal Service on Dynafocal Suspensions.

THIS new Lord Dynafocal Mounting is interchangeable as to vibration characteristics and physical dimensions with any mounting now in use on Convair 240 and 340, Douglas DC 6 Series, Martin 404 and Military Aircraft using R-2800c engines. The Lord MR36M is stronger than any mounting of previous design. Its light weight saves up to 16 pounds per engine, depending on the type of mounting system now used. This new Lord Dynafocal can replace your present heavy mountings without any rework whatever.

The Lord MR36M Mounting is approved by CAA, USAF and Navy Bureau of Aeronautics. The reduced weight on 2 and 4 engine aircraft enables you to realize an immediate profit in additional payload. For complete details you are invited to write direct or refer to the field offices listed below.

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it affects—and why. Slide-films deal with materials and approved techniques used on the job, while case history recordings review major problems arising from the job. In all cases, solutions are worked out through audience participation.

► **Historical Review**—PAA begins its training program with a motion picture reviewing the airline's growth over the past 25 years. Emphasis is placed on the big part played by the average employe.

Another film, "Flight Happy," shows how the cabin crew, by assuming roles as hosts and hostesses, work together to satisfy the customer. Others present problems from the passenger's point of view and compare the manner in which an inexperienced counter sales agent handles customers as opposed to a professional agent.

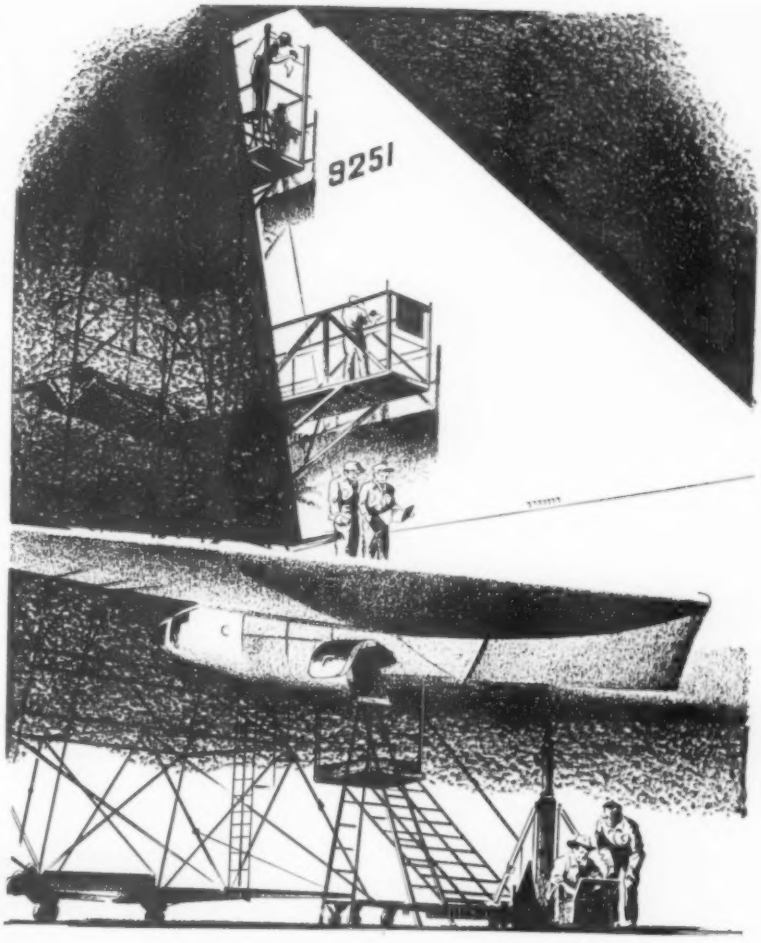
Telephone sales techniques also come in for a large share of attention. "Dial 'S' for Service" shows how unnecessary delays on the part of sales agents cause customer exasperation and possible loss of sales.

► **Sales Technique**—In its sales approach, PAA employs a technique called "cone-ing." The prospect is drawn into a cone or vacuum, point by point, until sale is made.

The employe is trained first to sell the company—"Always say 'Pan American,' never 'we.'" He gives the pros-

Missile Briefing

Air Force and Army officials view a relief map showing a typical installation for the new Boeing F-99 Bomarc pilotless interceptor during a recent briefing at Boeing Airplane Co., Seattle, Wash. Details of the still-classified Bomarc were carefully excluded from being shown in the photo. Viewing the installation, left to right: Lt. Gen. J. T. Lewis, Army anti-aircraft artillery commander with Air Defense Command; Gen. B. W. Chidlaw, USAF, commander, Air Defense Command, and Boeing president William M. Allen.



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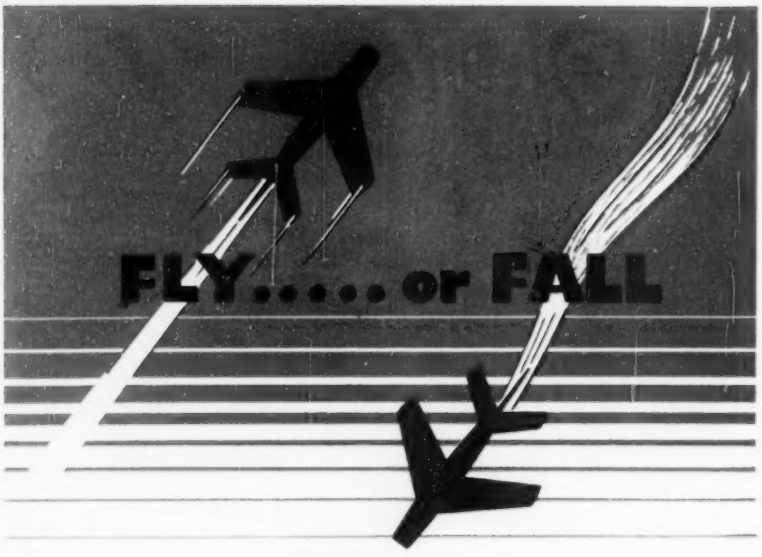

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AIR INTAKE SCREENS
Could make the difference

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Retractable Air-Intake Screens are a means of protection that allows the mission to be accomplished without the performance loss and icing hazard of fixed screens.

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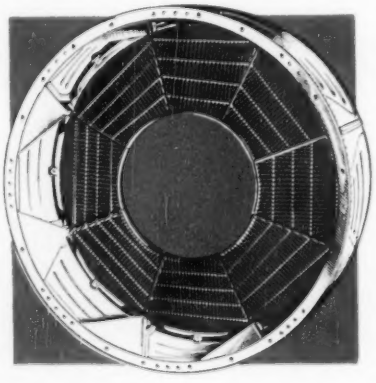

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pect a quick, brief description of the type equipment that will be used on the flight in question, and a description of route that the plane will follow, noting whether it is a direct, overnight or alternate route flight. Agent then introduces the personalized service features—such as berths, sleeperettes, meals and drinks.

Still following the cone-ing pattern, the agent then reassures his prospect with what he hopes will be the sales clincher—a statement on PAA's record revolving around the carrier's slogan: "World's Most Experienced Airline." This is believed especially effective with those who are somewhat timid about flying.

If prospect is still undecided, agent's training then leads him to cover the cone more thoroughly, section by section, emphasizing and giving more detail to sections which he feels are most important to the particular prospect.

PAA claims that application of this cone-ing technique has paid off appreciably in sales that might otherwise not have been made.

▶**Flight Zero Thousand**—The program's sound slide-films get down to particular cases. How indifferent attitude and poor, lackadaisical service on part of flight service personnel may cause an uncomfortable, uneasy flight is told in one presentation, while another film, depicting the same flight, demonstrates how proper attitude and service result in a thoroughly enjoyable flight. Additional slide films compare right and wrong way to handle passengers who have never flown before.

Even PAA captains come in for their share of attention in the program. A film entitled "Log of A Captain" is designed to stimulate pilot into realization that, in addition to commanding the aircraft, he has certain responsibilities to passengers and flight crew. Film encourages him to recognize passenger problems and to mingle with passengers in attempt to solve them.

▶**Geography**—Recently added feature of the program is a series of courses in geography covering all countries served in PAA's system. Company officials admit that they were shocked to find fairly widespread ignorance among employes as far as geographical aspects of areas were concerned.

An expert in the field was hired to prepare a series of geography studies which would break down into four main courses of 10 class sessions each. Three of the courses coincide with the carrier's three divisions—Latin American, Atlantic and Pacific-Alaska. Each offers a comprehensive study of the area, written in layman's language and amply illustrated by slide-films. Fourth course, designed for foreign nationals in PAA system, covers geograhy of U. S.

▶**Success Seen**—Success of the entire

Here's the big, handsome, DC-7 – Douglas' latest commercial airplane. This picture shows off the power packages built for the DC-7 by Rohr... world's largest producer of ready-to-install power packages for both commercial and military planes. In addition, Rohr Aircraftsmen currently are producing more than 25,000 different parts for all types of airplanes.

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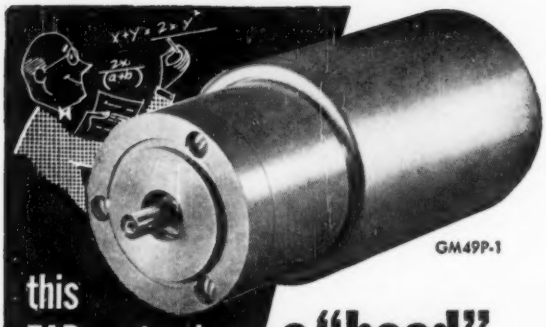

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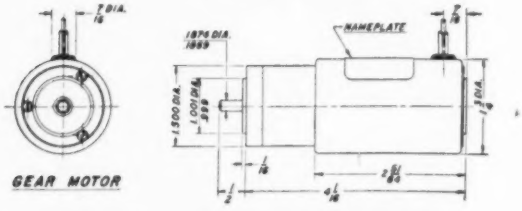
A precision gear head combined with a miniature motor gives you the answer to high torque at low speed. The motor can be 60 cycle, 400 cycle or variable frequency—in single, two or three phase—with non-cooled or self-cooled frame types. The gear head is arranged to provide the output speed you require, with standard timing ratios of 60, 3600 or 8000 to 1 possible. High output torques, to drive, actuate or control, in confined areas, make this line of tiny gear motors ideal for a wide variety of applications on the ground and in the air.



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SPECIFICATIONS FOR MODEL GM49P-1

400 Cycle Capacitor Run Induction Gear Motor

115 Volts • 400 Cycles • 1 Phase • 0.5 Amps.
Full Load Torque: 100 Oz.-In.
Starting Torque: Over 100 Oz.-In.
Gear Head Lubricated per Mil-G-3278
22 R.P.M. • 314 to 1 Gear Ratio • Reversible Rotation
Intermittent Duty: 15 Minutes on, 15 Minutes off

Ambient Temperature: −55° to +74° C

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training program has more than compensated for the capital investment involved in its implementation—preparation for professional training aids, distribution costs, etc.—says PAA.

"Major key to success of the program, however, has been employe enthusiasm," says Willis G. Lipscomb, PAA's vice president for traffic and sales. And employe comments seem to bear him out.

A Houston employe makes this observation: "I feel that my attitude towards PAA, the customer and everyone in general has greatly improved—I now can understand the other person's point of view."

Another from Tokyo, states: "Our reaction to the program, speaking for myself, and I believe the other supervisory personnel—it's about time something of this sort was instituted."

▶ **Boxscore**—Similar reactions have come from PAA stations all over the world. Boxscore to date shows that in one year of operation the program has been administered to over 35% of company personnel. In order to accomplish this, 330 hand-picked, employe-trainers first had to receive special training in conference leadership and use of the training aids.

Approximate number of hours per employe spent on training breaks down as follows: U. S. Sales, 12 per month; Atlantic Division, 10 per month; Latin American Division, 2-3 per week; and Pacific-Alaska Division, 10 per month.

Rheem Buys 30,000 Shares of Northrop

Los Angeles—Rheem Manufacturing Co. has become one of the largest stockholders of Northrop Aircraft with the purchase of 30,000 shares of Northrop common stock.

A Rheem representative will be placed on the Northrop board of directors if stockholders of the aircraft company approve the move.

They have been asked to amend the company's articles of incorporation and bylaws so that the number of directors may be not less than nine nor more than 12. If the change is approved, one additional director to represent Rheem will be named to bring membership of Northrop's board.

It is planned to nominate A. E. Ponting as the Rheem representative if the action of the stockholders is favorable. He is a director of Rheem and a vice president and director of Blyth & Co., investment bankers.

Rheem has been active in aircraft subassembly and guided missile work through its Aircraft Division. A spokesman for Rheem says the investment is one of several they have made as part of their company pension plan.

SUPERSONIC DESIGNS, thin straightwing (left) 80-deg. swept delta (right), envisaged by British designer Keith-Lucas.

How Future's Needs Will Shape Design

Successful supersonic aircraft will depend on meshing new performance criteria with materials and production methods.

The complex mixture of design and production considerations following from the move of aircraft speeds into the supersonic range encompass almost every phase of aircraft makeup, from basic aerodynamic configurations to specific internal details.

An instructive analysis of some of these overall design and production problems, showing how the factors affect one another, has been given by D. Keith-Lucas, chief designer, Short Brothers and Harland, Ltd.

▶ **Four Facets**—Delivered before Britain's Institution of Production Engineers' recent Second Conference on Problems of Aircraft Production, at the University of Southampton, England, the analysis considers these aspects of tomorrow's speedsters:

- **Aerodynamic details.**
- **Internal considerations**
- **Construction problems.**
- **Materials.**

Aerodynamics

Will the supersonic aircraft of tomorrow have swept wings? This is the first consideration in Keith-Lucas' analysis. Peak drag on a straight wing occurs at about sonic speed and is considerably reduced by thinning the wing as much as possible. Sweepback not only reduces peak drag, but delays its occurrence until higher Mach numbers.

▶ **Drag Consideration**—If the design is for speed just above sonic, there is an obvious case for using sweepback to delay the drag rise, Keith-Lucas observes. But, he claims, if we are to fly at about Mach 2, the amount of sweep required becomes "rather frightening." Thus, the use of a straight wing for flying at a speed well above the peak drag becomes quite attractive, he claims.

His analysis of a hypothetical aircraft with such a wing reveals that the wing is extremely thin—a thickness/chord ratio of probably only 3-4%. This is necessary, he points out, not only because of the enormous drag penalty of thicker wings at such high supersonic speeds, but also because the plane has to push through the peak drag speed.

Other compressibility effects—wing dropping, trim changing, and buffeting—reach a maximum value at about the same speed when drag rise occurs. These, like the drag rise, are rendered comparatively ineffective only with extreme thinness.

This wing, however, isn't much good for storage, not even for fuel. This pushes the engine out to the wing tips, and the landing gear, presumably, would have to be located in the fuselage—not a very appropriate arrangement.

▶ **Large-Sweep Airfoil**—The alternative to this arrangement, a configuration embodying about 80-deg. sweepback—appearing something like the ultimate in deltas—looks very much like a paper dart, Keith-Lucas says.

It is an easier job structurally than the straight-wing counterpart, lends itself much more advantageously for the stowage of fuel and landing gear. But even in this configuration the engines are still located on the outside, because if they were buried in the wing roots the losses in the long intakes and jet pipes would be unacceptable, Keith-Lucas contends.

The configuration seems practicable—the center of gravity is in about the right place, and longitudinal damping should be good, although the plane may be a bit touchy in roll, he says.

▶ **Will Increase Sweep**—There is little known about wings of this sort and there may be serious troubles ahead, Keith-Lucas believes. He points out that the nearest we have yet been to this configuration is on the S. B. 5. This Short Brothers and Harland, Ltd., research plane has 60 deg. of sweep. Keith-Lucas reveals that 69 deg. of sweep is a later target on this plane. This, he says, should provide useful data even though the plane is in the low-speed category.

For long-range aircraft, it is essential that the lift/drag ratio be as high as possible—only achieved by cruising at a reasonably large lift coefficient. Unfortunately, the highly swept delta planform has a low slope to its lift curve, so that a large lift coefficient means a large incidence, Keith-Lucas says. This in turn means a large induced drag because, at supersonic speeds, the lift vector is normal to the plane of the wing.

Probably, this is the strongest argument against the delta wing, Keith-Lucas claims, but he is still partial to the configuration, mainly because of the useful space contained in this type of wing.

Stowage Considerations

Aircraft stowage-capacity, already a vexing consideration, is likely to become even more acute as speeds rise. The designer will certainly try even more to reduce available volume to a minimum, because the penalty to be paid for unnecessary frontal area becomes so great, Keith-Lucas says.

▶ **More Space Needed**—An aggravating feature is that faster speeds will require more engine power, more fuel. Volume of fuel and engines, therefore, will tend to increase.

Another troublesome problem is the increasing amount of equipment that must be accommodated in new aircraft. This poses assembly problems for the production engineer in the final line stage. This troublesome aspect cannot be avoided, although good design may

greatly ease the problem of access, Keith-Lucas says.

In the days of the old roomy plane, stowage space was no problem—there was always room to add a bit of equipment. Today we cannot afford to carry all that space with us, Keith-Lucas claims, and for long-range operations part of the fuel has to be carried outside in the wing tip or in belly tanks. He cites the B-47, where both fuel and engines are slung outside.

The next step in the refinement process is to eliminate items. Keith-Lucas says he would like to start with the landing gear, but that after that it becomes a difficult choice. Rationalization and simplification of equipment is probably the most fruitful field, he says, but the problem deserves very careful thought.

Construction

One structural design consideration is that not only must the structure be light, but it must also afford the maximum of usable space inside the wing and fuselage.

► **Integral Construction**—In keeping with this requirement, Keith-Lucas examines integral construction. He cites as an example a machined slab to give a skin-stringer combination and compares it with the conventional skin-

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to many metering and positioning problems requiring extreme sensitivity *and* extreme durability.

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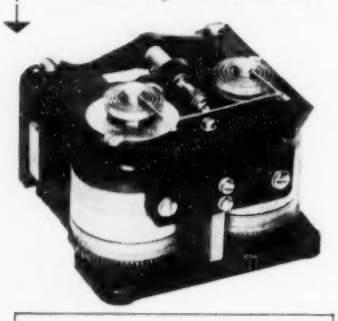
If *you* are being perplexed by a metering/positioning problem demanding a rugged — yet sensitive and accurate — movement, just drop us a line and we'll be glad to answer your questions in detail.

TI magnetic fluid clutch meter/positioner



SPECIFICATIONS

Meter/Positioner Movement

Sensitivity	6° per 100 microamps
Accuracy	±5%
Life	3000 hr @ rated load
Frequency Response	Flat to 5 cps, as applied
Deflection	30° either side of zero
Min. Input Signal	10 microamps
Max. Input Signal	500 microamps
Ambient Temp. Range	−40 to +75° C
Coil Impedance	15,000 Ω, 450 henries

following data taken w/o springs

Output Torque	0.125 oz-in./100 microamps
Maximum Output Torque	5-25 oz-in. at 4 milliamps

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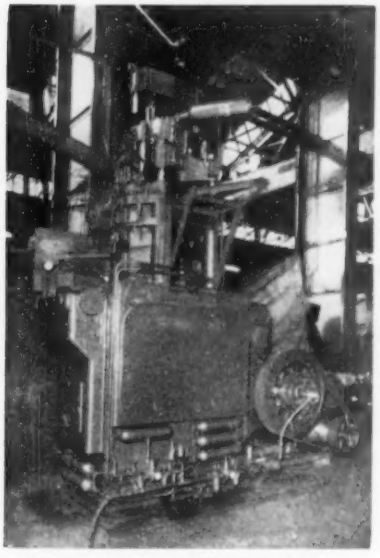
stringer built-up construction. The integral approach, he says, gave a saving of 25% on the weight of the component and, in production, the cost is estimated to be about 39% below the original. Weight saving results mostly because the skin and stringers are uniformly tapered and because no weight is brought in through joints.

He cites another reported advantage —that if the gross weight of the plane increases, the structure can be increased to suit merely by altering the depth of machine cuts, and without appreciable redesign.

Another weight-saving factor is the suitability of the construction for integral fuel tanks. As an example of production use of integral construction, Keith-Lucas reports that Lockheed has produced over 200 large wing panels, 4x30 ft., for the Super Connie.

▶ **Will Spread**—It is logical, he says, that the technique will soon spread to other parts of the aircraft structure, including wing ribs, spar webs, fuselage



Powder Metal Press

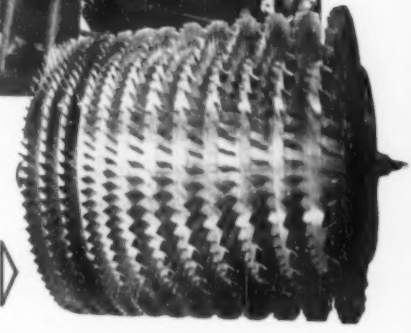
New press is specifically designed for compacting powdered metals, such as those used in the aviation industry. It can also be used for compacting ceramic parts and grinding wheels. One feature of the design is an arrangement allowing quick, accurate adjustment for changes of material density while the press is in operation. The press operates with four to 24 strokes per minute, with round die outside diameter of 10 in. possible, or with rectangular outside dimensions of 5x10 in. Rated pressure is 100 tons, but unit is being projected for pressure value of about half that amount. Made by Eddystone div. of Baldwin-Lima-Hamilton, the machine was first shown at the recent National Metals Exposition, Cleveland.

AIRCRAFT ENGINE BUILDERS LOOK TO

EX-CELL-O

For Volume Machining of Jet Blades

A production department for machining the airfoil form of jet engine blades



Finished jet engine compressor rotor

A complete line of automatic blade finishing machines, designed and perfected at Ex-Cell-O, turns out large volumes of jet blades to the specifications of engine builders. In addition, Ex-Cell-O, through its subsidiary, Robbins Engineering Company, machines rotor wheels, inserts the blades, and assembles the complete rotors.

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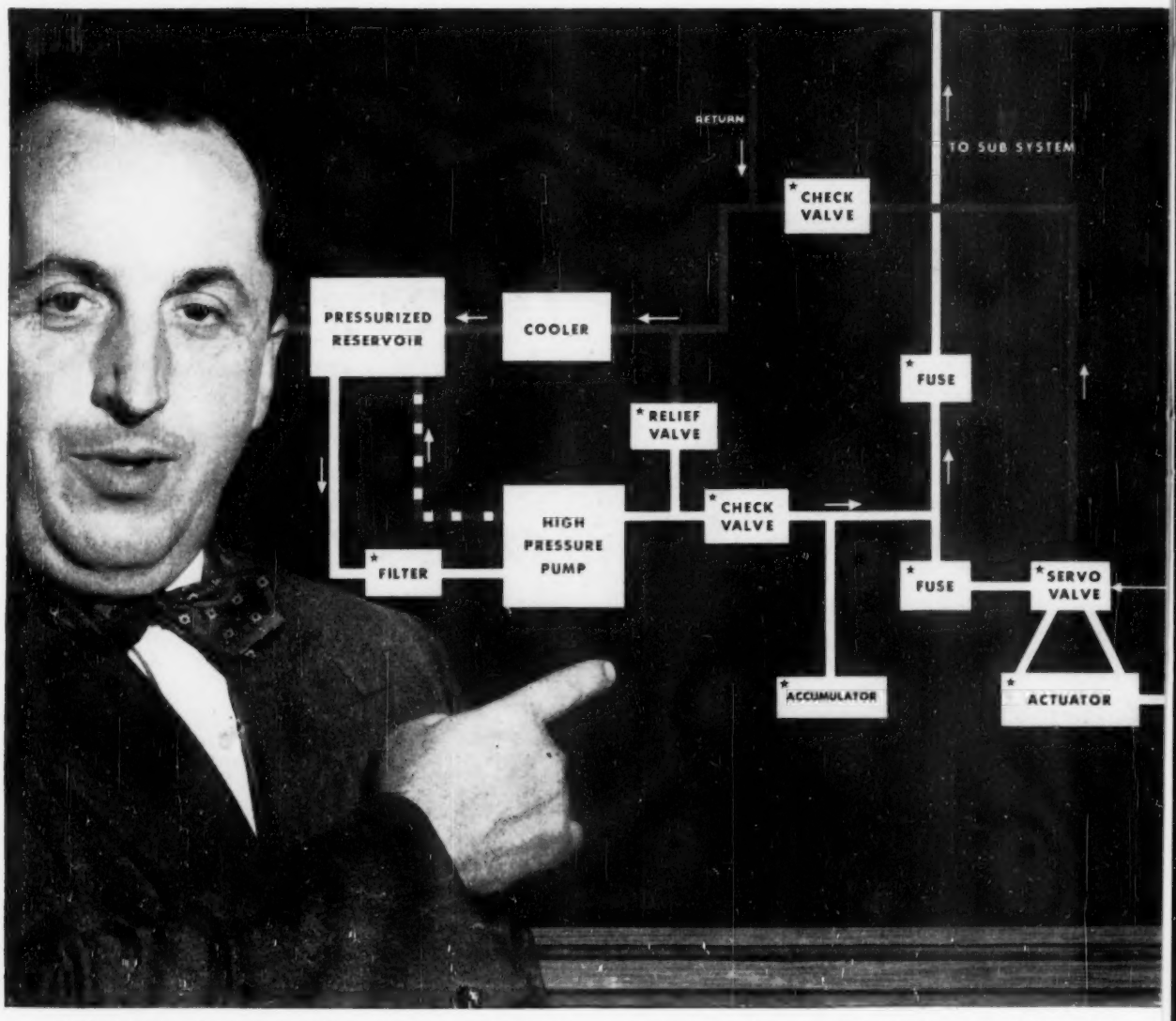

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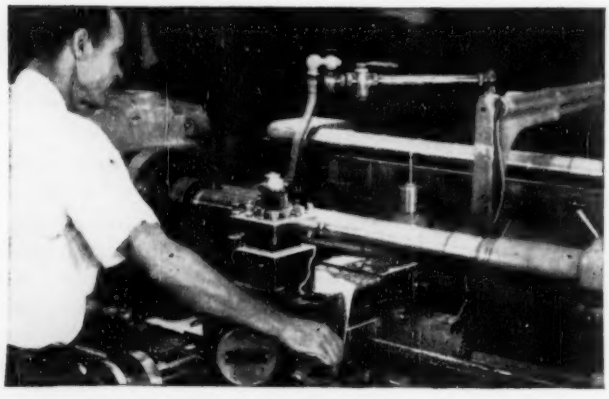

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100% test and inspection of Parker accessories make sure you get what you order. Accumulator test provides air pressures up to 3000 psi, hydraulic up to 10,000 psi.

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FEED BACK

Why you should specify Parker accessories for aircraft-engine hydraulic systems

"You get the benefits of experienced engineering, how-to-do-it knowledge, and faster service when you call in Parker for engine accessories," reports R. F. Halen, Parker sales engineer.

"Here is a typical hydraulic system with two subsystems," he continues. "All of the starred units indicate accessories that are offered by Parker. If you designed a system like this, we could supply dependable, long-life accumulators, check valves, relief valves, servo valves, fuses, actuators, and filters.

"For example, if you've had any experience with Parker cone check valves, you know they open quicker and deliver full line capacity with minimum pressure drop. They check absolutely tight under pressures up to 3000 psi.

"Another example, the Parker fuse shuts off positively if flow exceeds the specified velocity. It's designed for ambient temperatures from −65 to 400°F. This fuse is also self-compensating for changes in the viscosity of hydraulic fluids.

"Parker has centralized all engine-accessory engineering and manufacturing into a single operating division. Here you'll find engineers working to design accessories that offer not only extra performance benefits but also cost savings. Because quality depends largely upon precision manufacturing, you'll also find we use the most advanced manufacturing techniques which require many special-purpose machines. Each product must pass rigid inspections and tests that we set up to make sure the customer gets what he orders.

"Having a specialized group of customers, we are able to gear these facilities to a faster, more streamlined way of doing business.

"Whether you are interested in our many engine accessories for *hydraulic* systems, or for *fuel* or *hot-air* systems, why not call us in? We want the opportunity to discuss your requirements and to explain what we have in the way of abilities and facilities to serve you."

ENGINE ACCESSORIES DIVISION
The Parker Appliance Company
17325 Euclid Avenue, Cleveland 12, Ohio

Parker
Hydraulic and fluid system components

Look at these other products: nozzle and butterfly valve represent accessories for engine *fuel* and *hot-air* systems. Parker O-rings are approved for *all* military applications.

THE PARKER APPLIANCE COMPANY
Section 302-C
17325 Euclid Avenue
Cleveland 12, Ohio

☐ Please send me your new 24-page booklet about all types of Parker engine accessories, Bulletin 133081.
☐ O-ring catalog No. 5100.

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COMPANY _____
ADDRESS _____
CITY _____ STATE _____

Send for new brochure. It's a 24-page picture tour of Parker's Engine Accessories Division, showing its products, plus engineering, manufacturing, and test equipment.

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TRADE MARK REG. U.S. PAT. OFF.

FUEL INJECTION NOZZLES

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ENGINEERS AND MANUFACTURERS

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Fore or aft facing

Burns Aero seats are among the lightest ever designed • CM steel construction keeps maintenance at a minimum • Contoured and cushioned for greatest comfort • Superb craftsmanship • Built to individual airline specifications • Prompt, *on-schedule* delivery • Burns Aero-Tourist seats are in airline service throughout the world.

Write for details—Airline or Executive aircraft seats.

BURNS AERO SEAT CO., INC.

3900 COHASSET STREET, P. O. BOX 127 • BURBANK, CALIFORNIA

panels and possibly even cabin flooring.

He sums up the situation in this telling fashion:

In spite of all this there are designers, including many in America, who do not believe in integral construction. They say 'Our job is to manufacture aircraft—not chips,' or 'It is a natural law that hogging out of the solid is a pig of a business.'

"I suggest that most of those who condemn it have not tried it, like those who condemn modern art without having seen any. One American firm which does more 'sculptured machining' than most, claims that the cost of production, including machining, materials and overheads, is $1.67 per lb. against $6 or $7 per lb. by previous fabricating methods. These figures are striking whatever the factor of enthusiasm which we may choose to apply."

Extruding, forging, rolling or even welding must be explored to see if there is not a still cheaper way to attain integral construction.

The most serious objection to machining from the solid material is, according to Keith-Lucas, that it is going to be difficult to use the highest grade materials without encountering cracking and distortion. He also feels that it is doubtful whether the best properties can be obtained from material in slab form.

The logical development in integral construction is seen as deleting the ribs and substituting multiple webs running spanwise along the wing. This will pose a tough problem for the production engineer, since the accessibility for assembly will be extremely restricted.

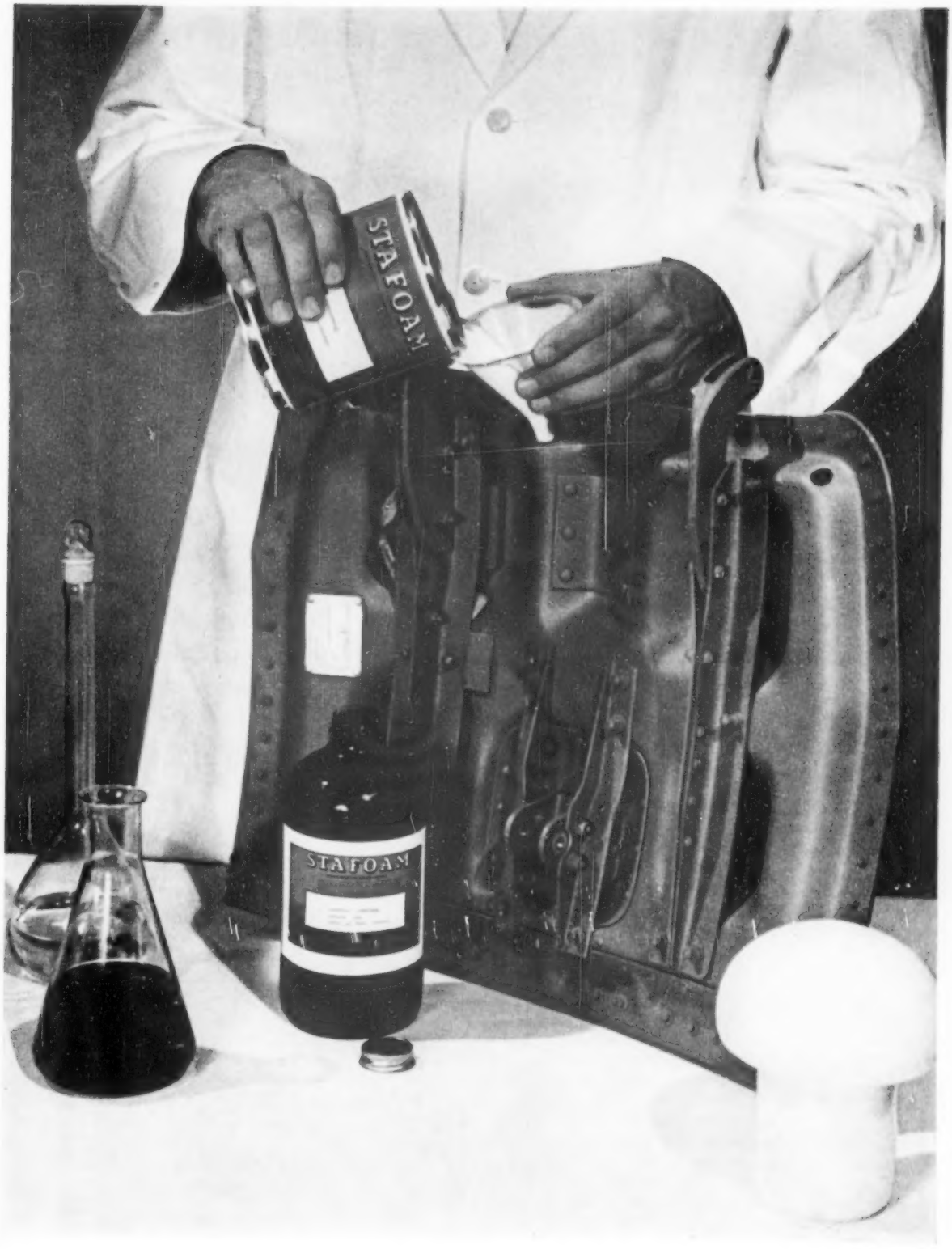
▶ **Metal Bonding**—Discussing adhesive bonding, Keith-Lucas points out that many designers are turning to Redux bonding in preference to rivets for attaching stringers (AVIATION WEEK Apr. 6, 1953, p. 48).

The most important advantage, he points out, probably is that the method gives better fatigue strength, but better surface finish also is involved. A continuous attachment between skin and stringers is afforded, preventing interrivet buckling and giving greater compressive strength.

While closed-section stringers, such as hat-sections or Y-sections, are more stable than open sections, such as the familiar Z-section, there has been a reluctance to use them because of the danger of undetected corrosion occurring inside the stringers and because extra riveting is involved. With Redux bonding, Keith-Lucas says, the closed sections become much more attractive; they are used extensively on the Comet.

Extruded rather than formed stringers also are gaining favor mainly because of the good longitudinal proper-

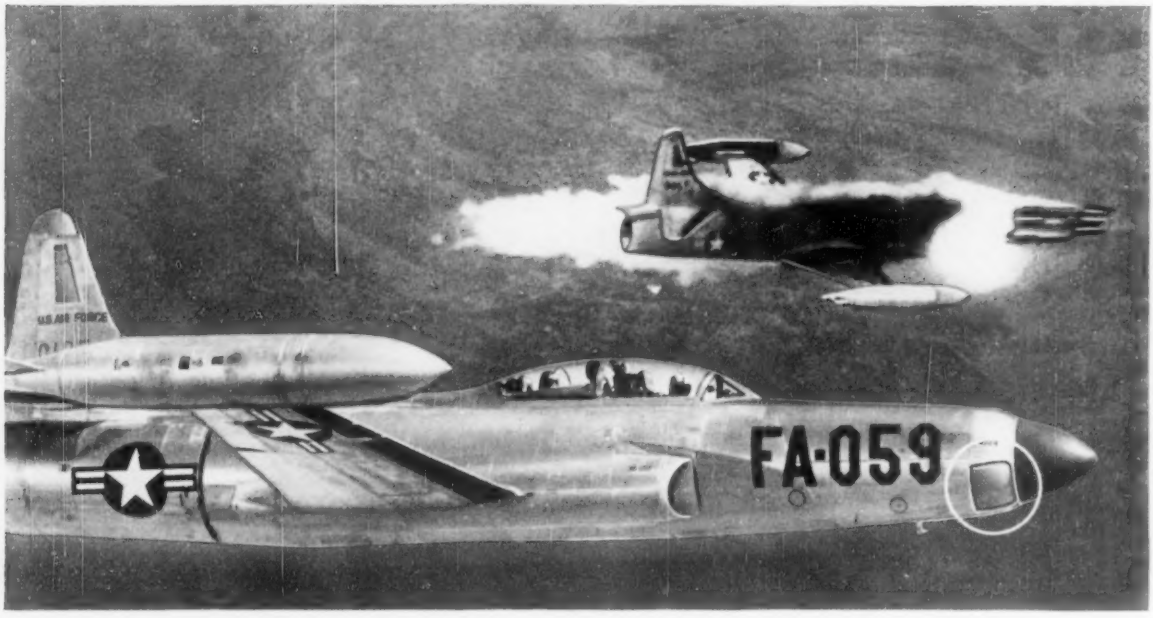
(*Continued on p. 53*)



AMERICAN LATEX' NEW STAFOAM

Pours like water, foams into super strong reinforcing for rocket doors (See next page)

F94C Rocket Door operation improved with Light, Inexpensive Stafoam



F94C Rocket exit doors are subjected to considerable heat and pressure during rocket firing. Stafoam filled door cavities prevent warpage and malfunctioning.

New miracle plastic adds necessary strength and insulation to prevent warpage caused by heat blast

The new revolutionary structural plastic, Stafoam Number 2010, takes countless hours of labor out of the manufacture of the F94C rocket exit doors. It is simply poured into the small orifices in the doors and in minutes it chemically foams into place, completely filling the cavity. After a short period of curing, Stafoam formulation number 2010 becomes a rigid thermal barrier to the extreme heat of the rocket fire. Prior to its use, high temperatures caused warpage and lack of sufficient rigidity which prevented the doors from closing. Without the necessity of re-designing and re-tooling, Stafoam completely overcame these problems. Light weight, cellular plastic Stafoam adds strength by bonding all surrounding members into a super strong unit in addition to supplying extra rigidity. Unlike most foam products, its cell structure is of a non-connecting type, making it moisture-resistant.

"Stafoam to revolutionize structural, insulation and safety fields"

"It is truly a miracle material." These were the words of C. M. Christie, President of American Latex Products Corp., at a recent trade press conference. After four years development work with Lockheed Aircraft Corporation, American Latex Products Corp. chemists have now established such varied applications of Stafoam that it will revolutionize methods and procedures in many fields. Among the more important Stafoam uses are in the insulation field because of its low thermal conductivity rate and moisture resistance; in the structural field because of its great strength and extreme light weight; and in the impact and collision field because of its slow flex recovery. Its ability to be poured in place in liquid form through small orifices makes it ideally suited for internal insulating and cushioning of many electronic devices as well as large structural members.

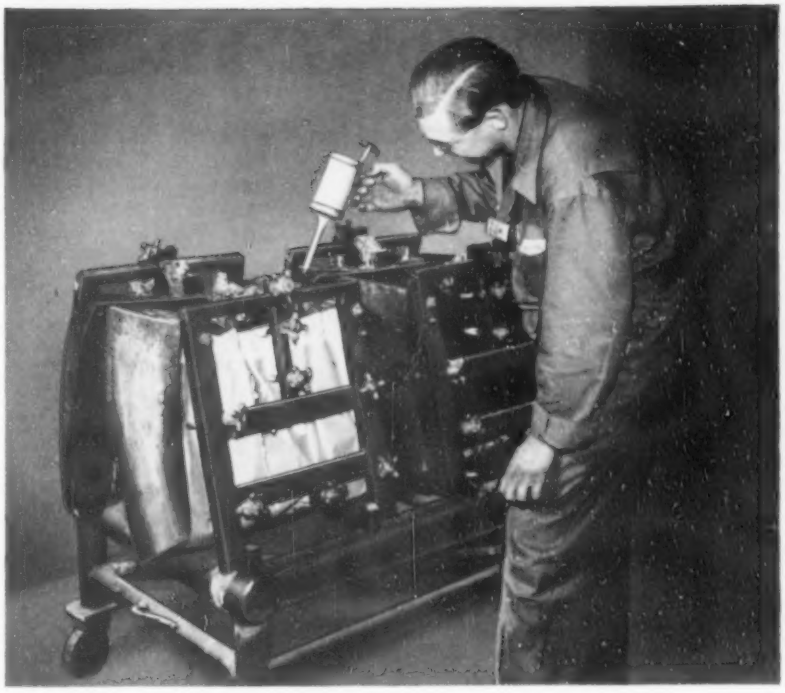
C. M. Christie

Stafoam is self bonding to most materials

Stafoam miraculously bonds itself to most surfaces, making it very suitable for insulation in the F94C doors. Through perfect bonding the equal distribution of loads adds tremendous strength to any unit containing Stafoam.

Stafoam easy to mix and apply to F94C doors

One of the most important advantages of using Stafoam in the F94C doors is the ease of handling required to apply it. No complicated equipment is necessary. Furthermore, because American Latex Products Corp. has removed most of the variables from formulation 2010, mixing the two components is reduced to merely pouring the contents of one container into the other. No measuring is required. The combined substance is mixed until it attains a slightly thick consistency. Then it is ready to pour. There is never any variance when properly mixed. Non-skilled personnel may be used for the application most successfully.



Filling F94C Rocket doors at American Latex Plant with foam-in-place Stafoam is easily and quickly performed with a kitchen-type cookie applicator. Doors are held rigidly in place, during curing, by simple jig.

NOTICE!

Although the information contained in this advertisement covers only one application, Stafoam is supplied in hundreds of densities, textures hard and soft with applications for almost every industry. Some formulations allow self curing, others provide for heat resistance in excess of 300°F. For more general information on this truly miracle foam plastic, write for our Stafoam brochure at the following address:

American Latex Products Corp.
PLASTICS DIVISION
3341 West El Segundo Boulevard
Hawthorne, California

Lockheed tests show Stafoam has most favorable strength to weight ratio

Two ounces of low density Stafoam occupies approximately 60 cubic inches and will withstand up to 100 PSI.

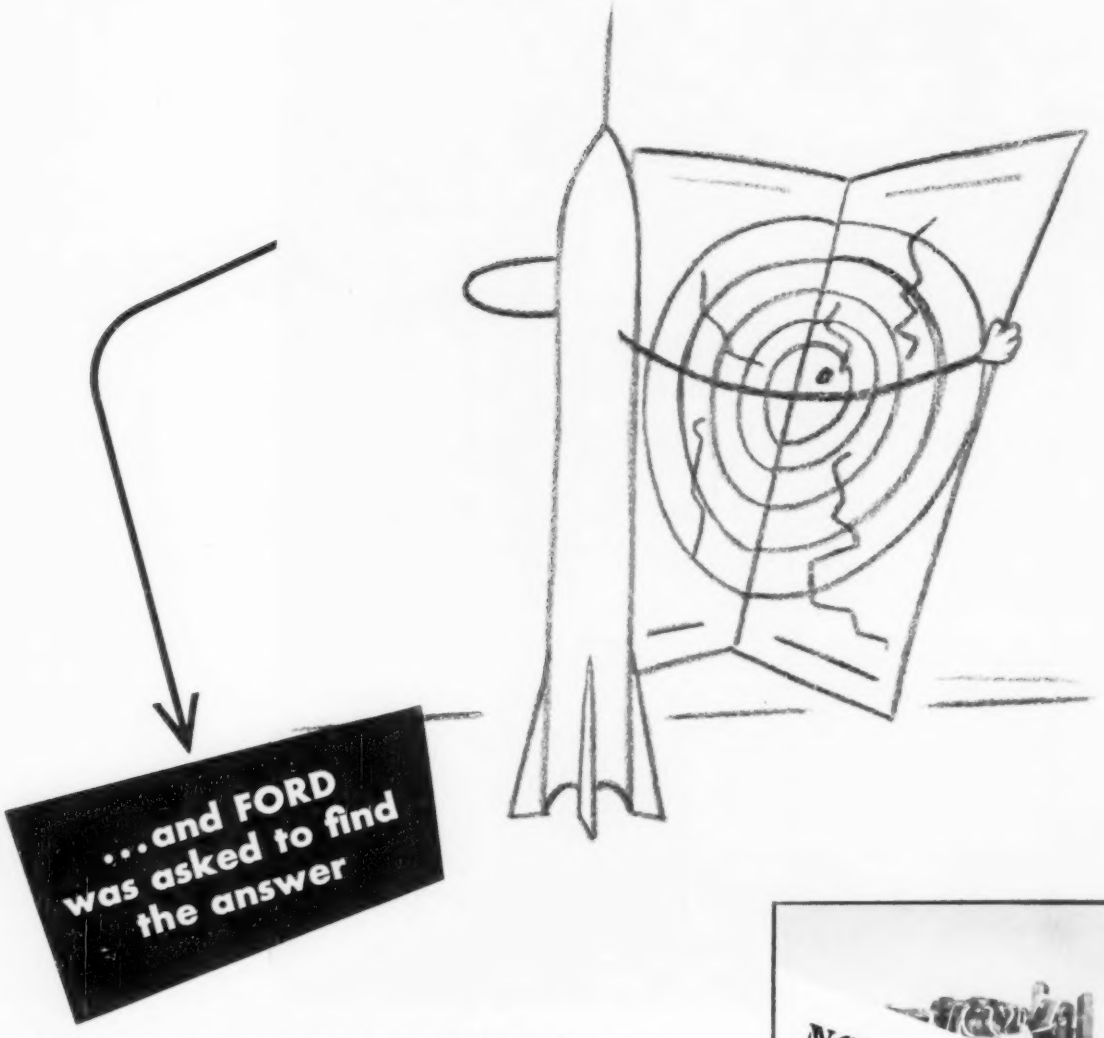
Because of Stafoam's superior strength to weight ratio, Lockheed found it ideally suited to aircraft manufacture. It is conceivable that soon Stafoam may completely replace metal ribs and stringers currently used in wing structures. By applying Stafoam to a shell of skin, greater strength for weight can be realized and many costly man hours of assembly time can be eliminated. Densities of from two pounds up have carefully been perfected and can be critically controlled.

STAFOAM, a registered trademark of American Latex Products Corp., is manufactured under *LOCKFOAM patents owned by Lockheed Aircraft Corp., Burbank, Calif.
**Registered Trademark of Lockheed Aircraft Corporation*

American Latex Products CORPORATION

3341 West El Segundo Boulevard • Hawthorne, California

HOW TO TEACH A MISSILE
to read a map



Zwish! And off goes a missile. But where? And how to stay on the right track? And how to *find* the target? That's the problem Ford Instrument is helping to solve.

This is typical of the problems that Ford has been given by the Armed Forces since 1915. For from the vast engineering and production facilities of the Ford Instrument Company, come the mechanical, hydraulic, electromechanical, magnetic and electronic instruments that bring us our "tomorrows" today. Control problems of both Industry and the Military are Ford specialties.

12

You can see why a job with Ford Instrument offers young engineers a challenge. If you can qualify, there may be a spot for you in automatic control development at Ford. Write for brochure about products or job opportunities. State your preference.

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ties involved and also because the corner fillet helps to resist instability.

The extruded Y-section probably is the most efficient form known, Keith-Lucas says, but a simple angle can be tapered by machining, thus duplicating one of the advantages of integral construction.

► **Sandwiches**—Envisaging metal bonding as opening up a wide field of possible sandwich construction, he sees aluminum honeycomb more appealing than foam or balsa substances as a filler material.

Honeycomb is seen used in a double-skin sandwich to replace the conventional skin-and-stringer combination or, in very thin components, as a complete filler between the outside skins. In the latter case it also replaces the ribs. (The wing and stabilizer of the Glenn L. Martin B-61 Matador pilotless bomber uses aluminum honeycomb as the filler material between upper and lower wing skins—see AVIATION WEEK Oct. 5, 1953, p. 28).

In either use, applicability is mainly to components in which the end loads are of fairly low intensity, Keith-Lucas claims. This includes the primary structure of light aircraft and, on high performance types, might include fuselages and tail surfaces and also the wings of delta aircraft, he says. For sweptback wings, with their higher aspect ratio and less taper, the end loads are of much higher intensity. Here, integral construction is more suitable.

One of the objections to the use of honeycomb sandwich is that it is costly in space, particularly in the light of integral fuel tanks. But this objection should not detract against the use of the material for control surfaces or bomb-bay doors, for example, where internal space is hardly usable.

Another limitation is that on very thin wings it is inefficient because it brings the material too near to the wing neutral axis. On thin wings of this type, the end loading is likely to be high, so that sandwich construction is unsuitable in any case, Keith-Lucas contends.

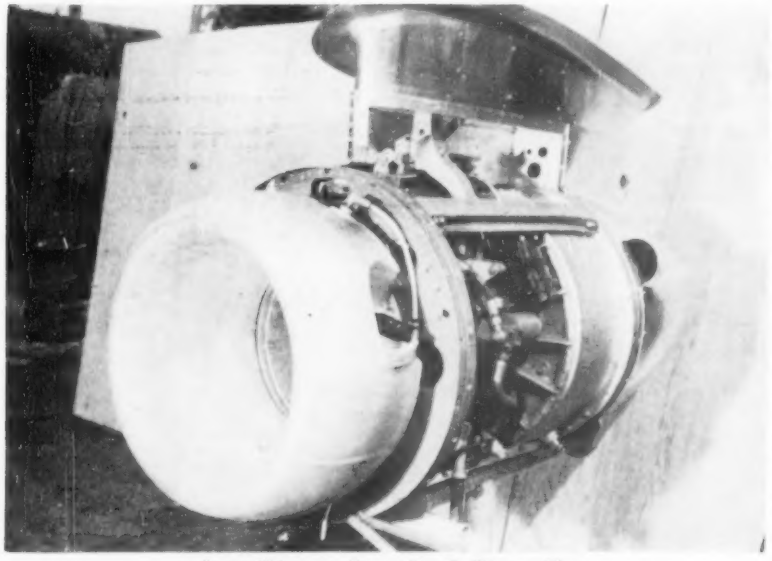
However, his guess is that the sandwich will be used extensively in the future and not only for secondary structures or on light aircraft.

Materials

Strength properties of aluminum alloys have improved steadily. Although a great help to the structural designer, "it begins to look as if we are nearing the end of what we can expect from this source," Keith-Lucas says.

Much of today's highspeed aircraft structure is designed on considerations of stiffness rather than strength, and in such case there is no point in using the very-high-strength materials, the British designer claims.

"This is really a confession of weakness," he says, "because it means that we are not getting the best out of our materials. The logical solution is to allow reduced stiffnesses by making the aeroelastic distortions work for us in-



Auxiliary Jet Pod Details

The auxiliary powerpack developed for El Al Israel Airlines by consultant Erich Schatzki is seen with all of its cowling removed. The engine is a Turbomeca Marbore jet giving 880 lb. thrust. Circular nosepiece serves the three-fold purpose of oil tank, oil cooler and venturi. El Al plans to run tests of the Marbore as an auxiliary power unit on a C-46 Commando (Aviation Week Aug. 10, p. 38). Price of the complete powerpack is estimated at $25,000 ready to install.

3rd International

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May 5, 6, 7, 1954

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An all purpose flux for soft soldering. Fluxes through oxides, oil, moisture . . . no cleaning of surface necessary. Provides a free flow of solder and makes a firm union possible. Non-acid eliminates danger of acid burns. For copper, brass, lead, galvanized iron, tin, steel, cast iron, ferrous alloys, Terne plate, zinc, etc.

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For all soft soldering of chrome or stainless steel and their various alloys. No surface cleaning necessary. You save clean-up time. Assures solid bond between solder and metal. To be used with either torch or soldering iron. Flux action keeps soldering irons clean. Available in paste form.

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Electro FLUX

Made specially for soldering electrical parts and electronic equipment. Free of salts, acids and alkali. Non-corrosive and non-conductive. Can be used for continuous tinning of copper wire. Available in stik or heavy liquid form. Electro Flux Stiks are excellent for use by radio and TV repair men.

Aluminum FLUX

Non-acid, non-staining . . . for use with pure aluminum or alloys, aluminum castings or aluminum alloy castings. Fluxes through oily surfaces. Can be used with 50/50, 40/60 or 95/5 solder. Has wetting properties that causes solder to flow freely. Saves clean-up time.

Consultation on Flux Problems Invited

If you have a special fluxing condition send soldered and unsoldered parts — outline the condition . . . our engineering division will recommend the correct flux for you or develop a special flux to meet your requirements.

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Chicago 12, Illinois

stead of against, and to overcome flutter by subtlety instead of inflexibility. This is the philosophy behind the aero-isoclinic wing which deserves a lot more attention that it has yet received."

The Short Sherpa, Keith-Lucas points out, is the first aircraft to be fitted with an aero-isoclinic wing. (For a discussion of this airfoil, see AVIATION WEEK Nov. 17, 1952, p. 22).

Other limitations to the use of high-property aluminum alloys are poor cross-grain properties and low elongation, he says, adding that there is also suspicion that they are not too good in fatigue. Much more must be learned about fatigue, but it is already known that with high-grade materials more meticulous care must be given surface finish of machined parts, and scratches avoided—particularly on wing sheeting.

▶ **Look at Titanium**—Like others in aviation circles, Keith-Lucas believes that titanium and its alloys hold great promise for the future—when they are better understood and when the price is down to something more reasonable.

He points out that only a few years ago one worry was about the effects of low temperatures on jet aircraft cruising in the stratosphere. There was deep concern about the notch sensitivity of certain steels at −70 or −80C. Concern was also voiced about transparent sections which became brittle and crazed easily.

Now, he says, we are equally worried by the high temperatures generated by supersonic flight. This is where titanium offers its greatest promise.

Pointedly commenting on titanium, Keith-Lucas says: "We must make the effort . . . to understand it properly. Its properties are not yet sufficiently consistent for us to put all our faith in it."

▶ **Joint Elimination**—Weight saving through the elimination of joints is stressed by Keith-Lucas. He points out that the use of large forgings, integral construction and plastic moldings are a beginning, but the idea must be extended.

Of all the recognizable trends in design, he says, the one towards fewer joints, hence towards larger pieces, is one of the most clearly defined.

▶ **Too Much Complication?**—Keith-Lucas contends it can't just be said that complication is unnecessary. His philosophy is that a designer's business is to design the right aircraft for the job. If added complication allows one aircraft to do the job of several or to do a job that cannot be done without that complication—then it is worth it, he says.

However, too much complication in a fighter makes it too large and heavy, impairs performance. Increasing costs brought on by this condition tend to decrease the number of aircraft procured.

Keith-Lucas sums up this phase of complication by asking: "What again is the use of the perfect aircraft if we have so few of them that we lack the vital one in the right place to meet the enemy when he attacks?"

Emphasizing the teamwork necessary in pursuing new ideas, he concludes that the production man and the designer must chase these ideas together, neither leaving the other behind, for the simple reason that neither is any good without the other.

—Irving Stone

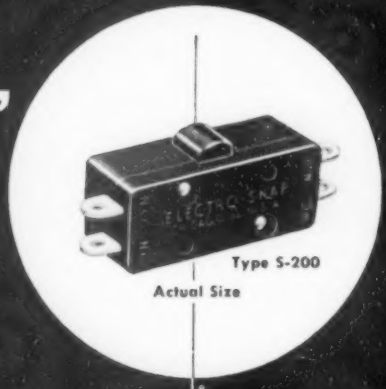
Thunderstreak Production in High Gear

Fuselage sections for Republic Aviation Corp.'s new sweptwing F-84F Thunderstreak fighter-bomber take shape (foreground) in one section of the Farmingdale, N. Y., plant with planes being completed in considerable quantity in final assembly (background). The tightly grouped assemblies indicate large Air Force orders.

ELECTRO SNAP

"HAMMER-BLOW" Vibration-Proof SWITCH

Gives Exact Switching Control Regardless of Shock or Vibration



Now, no more premature switching at trip point due to shock or vibration. This new Electro-Snap miniature switch operates *only* when you want it to—and at exactly the same trip point every time!

A special snap action mechanism maintains positive pressure (45 grams) on contacts until trip point. Switch can't be "tickled." When actuated, the mechanism slams the movable contacts to their new position with "hammer-blow" force. An exceptionally high holding pressure (150-200 grams or twice that of standard switches) after actuation prevents trip point "flutter" and contact "bounce"; reduces arcing for longer life. Switch is rated at 10 amps., 125–250 v. AC or 30 v. DC.

Since the snap action is independent of the speed of actuation, you can get exact control even with slow moving cams. A small movement differential gives you the precision you need for limiting movement of presses, grinder and milling feeds, and many other machine uses. When vibration is your problem, the Electro-Snap "Hammer-Blow" switch is your solution.

Get full details in Data Sheet SB-1.

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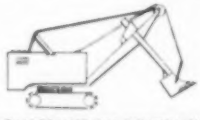
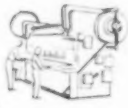


CONSTRUCTION EQUIPMENT

PRESSES



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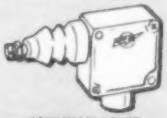
MODERN DESIGN IN A COMPLETE LINE OF SWITCHES

SUB-MINIATURE SWITCH

DOUBLE-POLE SWITCH

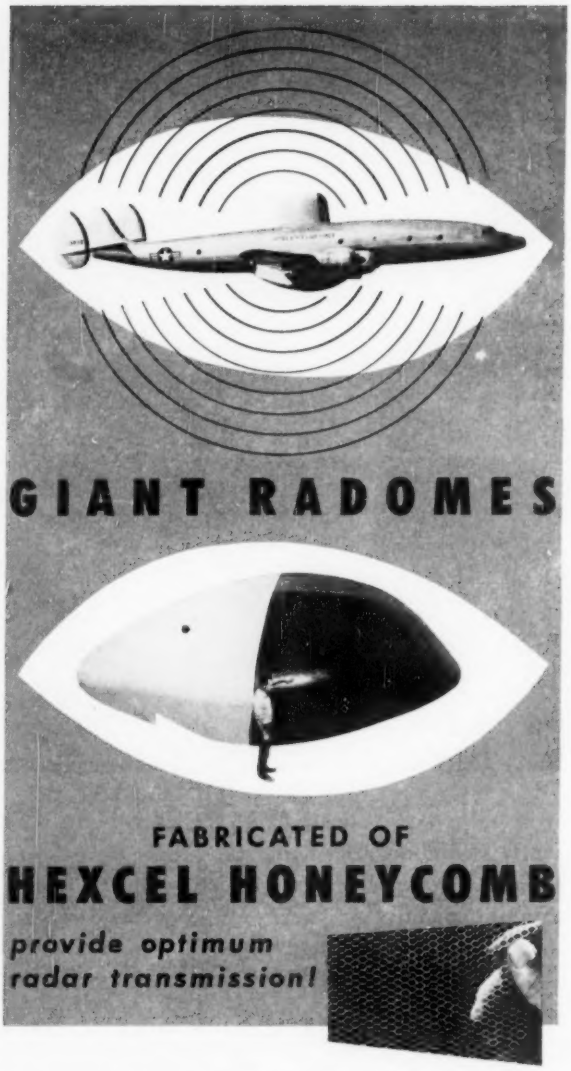


ONE-WAY LIMIT SWITCH

IMMERSION-PROOF SWITCH

HERMETICALLY-SEALED LIMIT SWITCHES

. . . IT'S HEXCEL HONEYCOMB AGAIN!



The excellent microwave transmission qualities of Hexcel glass fabric-plastic Honeycomb make it ideal for use in *both mammoth radomes* of this "Early Warning" Super Constellation.

Faced with glass fabric-plastic skins, Hexcel Honeycomb also provides high strength with minimum weight, maximum rigidity and smooth exteriors.

The belly radome is probably the largest reinforced plastic structure ever built; the upper radome is 8' tall. Both radomes are fabricated for Lockheed Aircraft Corporation by Zenith Plastics Company.

Combined with the Super Connie's range and altitude flexibility, these unique radomes give 360-degree radar coverage, beaming search rays far beyond the sea-level horizon.

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PRODUCTION BRIEFING

▶ **Hydro-Aire, Inc.,** Burbank, Calif., has purchased an additional 10 acres in the vicinity of its main plant to expand turbo-machinery research and development, and for production of aircraft fuel booster pumps.

▶ **Lunn Laminates, Inc.,** Huntington Station, N. Y., and Ashtabula, Ohio, has obtained the exclusive services of Gassner Aircraft Engineering, New York, N. Y., for design, engineering and consultation in reinforced plastics.

▶ **H. K. Porter Co., Inc.,** Pittsburgh, Pa., has acquired Alloy Metal Wire Co., Prospect Park, Pa., and will operate it as a division of the parent firm. Alloy Metal Wire produces stainless and alloy steel wire, rod and strip.

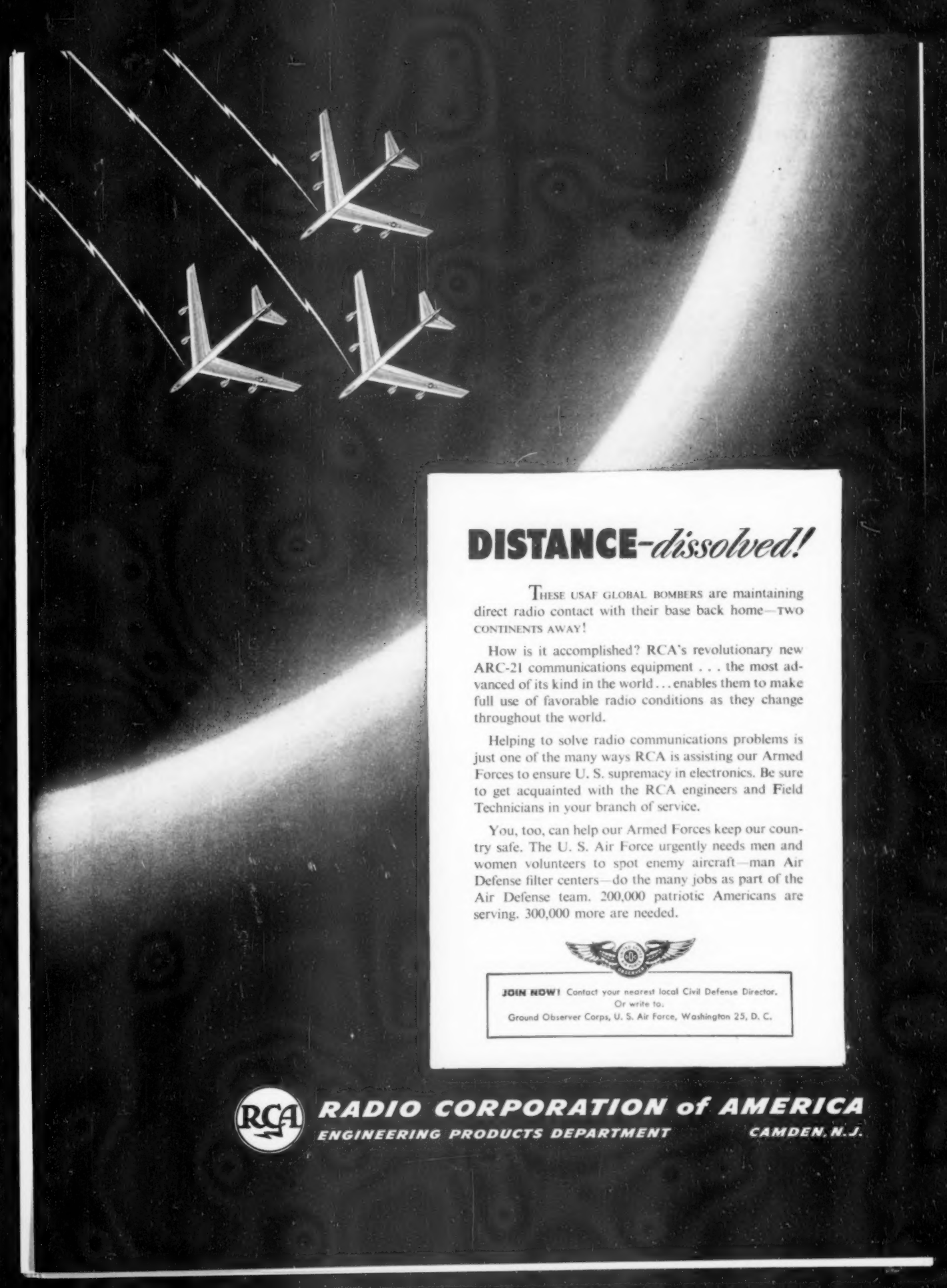
▶ **Helipot Corp.,** South Pasadena, Calif., precision potentiometer maker, has opened an eastern plant in Mountainside, N. J., with 14,000 sq. ft. of manufacturing area. An additional 6,000 sq. ft. in the new plant will be used for eastern regional offices and showrooms.

▶ **Borolite Corp.,** Niagara Falls, N. Y., has joined with three other firms to expand research and development of various metal borides for military and civil applications. Borides, carbides and aluminides show promise of handling 1,600-2,000F temperatures in turbojet, rocket nozzle and other applications. The firms that will cooperate with Borolite are Firth Sterling, Inc., Pittsburgh, Pa., American Electro Metal Corp., Yonkers, N. Y., and Carborundum Co., Niagara Falls, N. Y.

▶ **Planeservice, Inc.,** San Fernando Valley Airport, Van Nuys, Calif., has been organized by Bill Shute and Rod Rodriguez to handle aircraft maintenance and repair, specializing in business planes. The firm has acquired the assets of R&S Aircraft Service, Inc., and equipment and facilities of Neo Air.

▶ **Flex-O-Tube Division** of Meridan Corp., has opened a new assembly plant at 10711 Chandler Blvd., North Hollywood, Calif., to service the West Coast's hose and hose coupling requirements. Flex-O-Tube's main plant is in Detroit.

▶ **Westinghouse Electric Corp.,** Pittsburgh, Pa., is moving engineering and other office personnel into the firm's $2-million Atomic Power Division plant in Harmar Township, approximately one-mile northeast of the Allegheny Valley Interchange of the Pennsylvania Turnpike.



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How is it accomplished? RCA's revolutionary new ARC-21 communications equipment . . . the most advanced of its kind in the world . . . enables them to make full use of favorable radio conditions as they change throughout the world.

Helping to solve radio communications problems is just one of the many ways RCA is assisting our Armed Forces to ensure U. S. supremacy in electronics. Be sure to get acquainted with the RCA engineers and Field Technicians in your branch of service.

You, too, can help our Armed Forces keep our country safe. The U. S. Air Force urgently needs men and women volunteers to spot enemy aircraft—man Air Defense filter centers—do the many jobs as part of the Air Defense team. 200,000 patriotic Americans are serving. 300,000 more are needed.

JOIN NOW! Contact your nearest local Civil Defense Director.
Or write to:
Ground Observer Corps, U. S. Air Force, Washington 25, D. C.

RCA **RADIO CORPORATION of AMERICA**
ENGINEERING PRODUCTS DEPARTMENT **CAMDEN, N. J.**

U.S. Firms See Reverse Jet Unit

A French reverse-thrust device which could go into production tomorrow has been shown to U.S. turbojet manufacturers. It was recently demonstrated here by Henri Desbrueres, president and director-general of the French nationalized engine firm, Societe Nationale d' Etude de Constructions de Moteur d' Aviation (Snecma).

In an exclusive interview with AVIATION WEEK, Desbrueres said that extensive tests made on five types of jet engines had proven the worth of the Snecma reverse-thrust unit. It has been used in place of air brakes up to a Mach number of 0.9 at various times during a flight test program now nearing the 150-hr. mark.

Between 20 and 30% of the static thrust of the engine will be available as reverse thrust by using the Snecma device, Desbrueres says.

▶**Trip Purpose**—Desbrueres visited the United States to exchange turbojet data with American firms and to determine their interest in building or developing the Snecma reverse-thrust device in this country. He says there was considerable interest on the part of most American manufacturers, and he believes the Snecma unit is more advanced than any other he has seen.

Snecma's big Vulcain turbojet, currently in pre-production, completed a qualification test at 10,000 lb. sea-level static thrust last May: Desbrueres says this engine is now ready for qualification tests at the 11,000-lb. mark.

Vulcain production is scheduled to begin in 1955 with an 11,000-lb.-thrust engine. It is a single-compressor axial-flow turbojet basically the same as, but bigger than, Snecma's Atar series.

▶**Current Production**—Most of the firm's facilities are devoted to turning out the Atar 101D and 101F with the E series coming into production.

Current thrust rating of the 101D is 6,600 lb. from an engine weighing approximately 1,900 lb. With an afterburner, the D will give 8,400 lb. thrust; the designation for the combination of the D engine and afterburner is 101F.

Still another engine in the series—the 101E—is rated at 7,270 lb. thrust without reheat. Using the same afterburner that Snecma developed for the D engines, the E turbojet upped its thrust to about 9,400 lb. on the test stand.

This increase in thrust has been achieved without any weight increase; in fact according to Desbrueres, there was an appreciable weight decrease. Designation for the 101E engine with afterburner is 101G.

Temco Buys Rights To Twin Navion

Temco Aircraft Corp., Dallas, has purchased exclusive engineering and conversion rights for modifying Ryan Navions to twin-engine configuration from the original owner, Dauby Equipment Corp., Los Angeles. Riley Aircraft Corp., Dallas, continues to handle Twin Navion sales and distribution under a contract with Temco.

Temco has been converting Navions to twin-engine four-place business planes since April 1953 under a $1.9-million contract it had signed with Riley. At least 100 conversions by May 1954 are covered under this contract.

The company recently inaugurated two modifications increasing the Twin's allowable gross weight by 400 lb. to a maximum of 3,350 lb. (AVIATION WEEK Jan. 4, p. 126).

APD Office Expands

Cleveland Air Procurement District has been expanded to include the northwest corner of Ohio, formerly served by the Detroit district, and parts of central Ohio and West Virginia, formerly under the Dayton office.

The new boundaries parallel those of other state and federal agencies.

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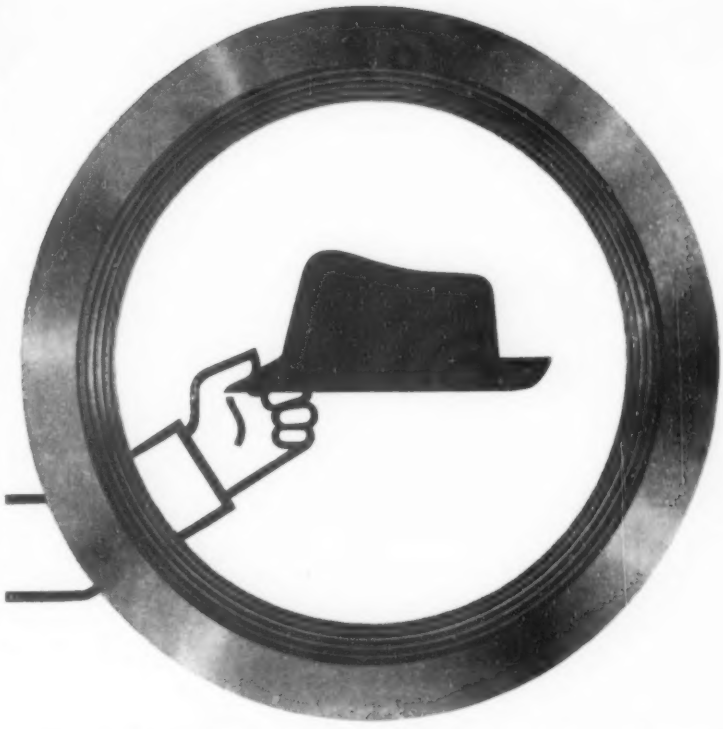

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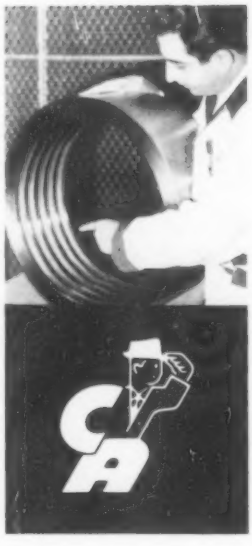

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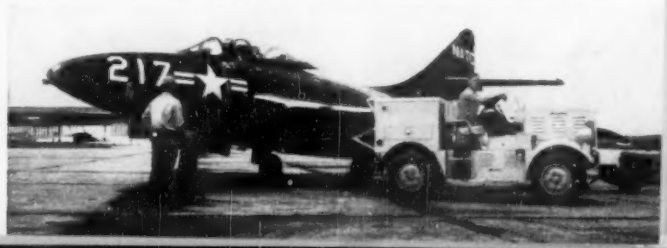
GENERAL ELECTRIC

G-E Frequency Changer Energizer, 400-cycle (above)
G-E Motor-driven Energizer, 500/1000-amp, 28-volt (below)

Navy Type NC-5 Energizer manufactured by the Consolidated Diesel Electric Corp., Stamford, Conn., equipped with G-E AC and DC generators and control.



USAF Contracts

Following is a list of recent USAF contracts announced by Air Materiel Command.

Aero Serv. Corp., 236 E. Courtland St., Philadelphia, aerial photography of western cities, $26,530.

Bendix Prod. Div., Bendix Aviation Corp., South Bend 20, Ind., wheel, 9 ea., brake, 9 ea., brake, 12 ea., $26,400.

Brown Trailers, Inc., P.O. Box 873, Toledo, Ohio, shipping container, 2 ea., temperature record device, 7 ea., chassis, 2 ea., $33,778.

Curtiss-Wright Corp., Propeller Div., Caldwell, N. J., special tools, $25,160.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., indicator, fuel, 950 ea., 333 ea., 760 ea., $105,276.

Electronics Div., Curtiss-Wright Corp., Carlstadt, N. J., flight simulators, 4 ea., $3,200,000.

Lear Inc., 110 Ionia Ave., N.W., Grand Rapids, Mich., components of F-5 automatic pilot system, $1,152,413.

RKO-Pathe Inc., New York, N. Y., production of a motion picture, 1 ea., $94,595.

Republic Mfg. Co., 1930 W. 77th St., Cleveland, Ohio, valve assy., 280 ea., valve assy., shut off, 100 ea., valve assy., ball check, 178 ea., $28,462.

Sperry Gyroscope Co., Div. of Sperry Corp., Great Neck, N. Y., motor and drive assy., 228 ea., 473 ea., 228 ea., $815,657.

Union Elec. & Mfg. Co., 1057 Summit Ave., Jersey City, N. J., radio set, components of AN/ART-13A, $153,059.

Navy Contracts

Contracts recently announced by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, are:

Bendix Products Div., Bendix Aviation Corp., 401 Bendix Drive, South Bend 20, Ind., parts for R2800-52W engines, $290,-377; parts for R4360 engines, $43,041; carburetor assy., for various aircraft, 515 ea., $534,884.

Scintilla Magneto Div., Bendix Aviation Corp., Sherman Ave., Sidney, N. Y., spare parts for J57-P-1 engines, $167,319.

Glidden Co., 11001 Madison Ave., Cleveland 2, Ohio, lacquer, camouflage, 53,712 qt., $35,875.

Inter-Constal Paint Corp., 2320 Edgewater Ave., Baltimore 22, Md., compound, rust arresting, 20,000 gal., $33,560.

Lear, Inc., 110 Ionia Ave., N.W., Grand Rapids 2, Mich., screw jacks, $26,648.

Liquidometer Corp., Skillman Ave. & 36th St., L. I., 1, N. Y., units for FJ-2 aircraft, $140,484.

Lowe Brothers Co., 424 E. Third St., Dayton 2, Ohio, lacquer, camouflage, 37,240 gal., $78,872.

Marquette Metals Products Co., 1145 Galewood Drive, Cleveland 10, Ohio, various assys. for P2V-5, -6 aircraft, $26,792.

Minneapolis-Honeywell Regulator Co., 2600 Ridgway Rd., Minneapolis 13, Minn., racks and tank units, $26,490.

New York Rubber Corp., 100 Park Ave., New York 17, N. Y., pararaft kit, 4,450 ea., $314,925.

Rubbercraft Corp. of America, Inc., 151 Orange Ave., West Haven, Conn., life raft, 481 ea., $149,395.

Sherwin-Williams Co., 325 N. Broad St., Philadelphia 7, Pa., lacquer, camouflage, $39,746.

William Armstrong Smith Co., 109 E. Forrest Ave., East Point, Ga., synthetic primer, 89,844 gal., $98,379.

Soderberg Mfg. Co., Inc., 628 S. Palm Ave., Alhambra, Calif., light, cockpit, 7,046 ea., $40,726.

Sprague Engr. & Sales Co., 1144 W. 135th St., Gardena, Calif., accumulator for various aircraft, 176 ea., $25,140.

Titanine, Inc., Morris & Elmwood Aves., Union City, N. J., lacquer, camouflage, $31,031.

United States Gauge Co., Clymer Ave., Sellerville, Pa., pressure transmitter, $133,776.

United Aircraft Corp., Hamilton Standard div., Windsor Locks, Conn., spare parts used on HSD propellers, $335,303; material for use on HSD propellers, $46,271; propeller assembly, 179 ea., $179,860; material for use on HSD propellers, 220 ea., $119,020; maintenance and overhaul parts for HSD propellers, $120,221; miscellaneous propeller and governor parts, $194,880; spare parts used on propeller assemblies, $655,820; spare parts for use on HSD propellers, $61,608; material for use on J57-P-1 engines, $530,845.

United Aircraft Corp., Pratt & Whitney Aircraft div., East Hartford 8, Conn., spare parts for support of P&W engines, $138,573; spare parts used on P&W engines, $38,186; material for P&W engines, $28,155; $244,740 spare parts used on P&W engines, $206,493; $306,794; crankcases, $152,042; $128,532; material for J48-P-5 engines, $414,941 ;spare parts for P&W engines, $32,441; material for R4360-59B engines, $113,530; spare parts to be used on P&W engines, $63,140; material for P&W engines, $374,971; material to be used on P&W engines, $286,-087; material for use on P&W engines, $1,762,494; spare parts used on P&W engines, $119,611; master rod assys. and bearings, $28,875; spare parts used on P&W engines, $100,524; $391,160; case stud assys., guide assys. and pistons, $499,820; spare parts to be used on P&W engines, $71,288; bearings to be used on P&W engines, $104,371; spare parts for P&W engines, $284,526; rings & stands, $72,298; spare parts for support of P&W engines, $3,007,234; spare parts used on P&W engines, $754,537; spare parts for P&W engines, 146 ea., $64,650.

Van Norman Co., 3640 Main St., Springfield, Mass., milling machine, 14 ea., $146,958.

Westinghouse Electric Corp., Lamp div., 3001 Walnut St., Philadelphia 4, Pa., incandescent electric lamps, $25,567.

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FINANCIAL

NAA Earnings Hit Postwar Peak

Net income of nearly $13 million after taxes, and sales of more than $636 million come close to wartime high.

North American Aviation, Inc., the first major aircraft producer to report its 1953 results, racked up record postwar sales of $636.5 million in its fiscal year, ended Sept. 30. This more than doubles the $317.2 million sales of the previous fiscal year, but falls short of NAA's all-time record of $680 million for 1944.

These results are significant, not only as they pertain to North American, but as a possible reflection of other aircraft corporate reports that are yet to come.

▶ **Net Income Up**—Net income, after taxes, for 1953 came to $12.8 million, or $3.72 per share on 3,435,033 shares outstanding. This compared with $7.8 million, or $2.28 per share, for 1952. Earnings for 1953 were exceeded only in 1944, when they amounted to $14.2 million.

Although sales increased more than 100%, net income after taxes gained only 64%. This reveals the continuing contraction in profit margins before and after taxes.

For 1953, profit margin on sales before taxes was 6.3% as against 6.4% the year before and 9.4% in fiscal 1949. Profit margin after taxes in 1953 was at an all-time low, 2%. This compared with 2.5% for 1952 and 5.9% reached in 1949.

▶ **Dividends Rise**—Nevertheless, dividend payments to North American stockholders increased. During fiscal year 1953, two 75-cent dividend distributions, or a total of $1.50 per share, were made. This compared to $1.25 per share annually made for the three preceding years, $1.00 in 1949, 50 cents in 1948, and a lapse in 1947. Management notes that during the past 15 years, stockholders have received dividend payments comprising approximately half of the company's earnings.

A further increase in dividends for 1954 is indicated with the semi-annual payment of $1.00 per share on Jan. 8, 1954.

▶ **Net Worth at Peak**—The retention of about half of the company's earnings has permitted a material bolstering of the net worth or equity position. At Sept. 30, 1953, North American's net worth reached an all-time peak of $65 million, or $18.94 per share. Significantly, this compares with an equity reported at only $6 million, or $1.76 per share, at the 1937 year-end.

Gross capital expenditures during the 1953 fiscal year amounted to more than $5.9 million, compared with the $7.4 million expended for this purpose during 1952. Construction of its own facilities has figured prominently in North American's program in maintaining a leading position in the aircraft industry. This phase receives special mention in the company's annual report.

Reference is made to the contemplated construction of a new supersonic windtunnel and additions to other development facilities.

▶ **1954 Outlook**—The company's estimated backlog at Sept. 30, 1953, was $1,107 million, including $212 million of business in negotiation. Comparable backlog figures at Sept. 30, 1952, stood at $1,321 million.

Despite this small relative decrease, unfilled orders more than substantiate management's assertion that: "Present schedules for the 1954 fiscal year call for continued production at relatively high rates, and it is expected therefore that sales will be substantial."

▶ **Unsecured Loans**—This measure of activity has necessitated heavy working capital requirements. Total inventories at Sept. 30 aggregated $314.6 million against which progress payments of $224.8 million were received from the government. This left $89.8 million of inventories to be financed by the company itself. For this purpose management utilized short-term borrowings which were outstanding in the amount of $60.5 million at the 1953 fiscal year-end.

A reflection of North American's credit position is indicated by the unsecured nature of these loans. Net working capital (after full allowance for bank borrowings) amounted to $48.4 million at Sept. 30, 1953, up from the $40.4 million a year earlier.

▶ **Strike's Effect**—A supplementary letter to the annual report comments on the strike of its employes which "officially" ended Dec. 22, 1953. Among other things, it is noted that the settlement agreement signed by the union negotiators was the same wage increase program proposed by the company before the strike. Management estimates that during the 54-day period of the strike employes lost more than $16 million in wages.

As for operations, management notes

that: "While the first quarter of the current fiscal year will be affected, it is not anticipated that the strike will materially reduce the company's sales and earnings for the entire 1954 fiscal year."

▶ **Private Research and Development**—While the financial figures speak for themselves in revealing the outstanding accomplishments of North American, the annual report devotes considerable space to the technical development it has undertaken in the aeronautical sciences.

This work has made it possible for the company to become a major factor in airplane, missile and control equipment, and atomic energy development.

Particularly revealing is the measure of research and development necessary to come forward with a winning production item. A period from four to seven years between the initial design conception of a new type is frequently required before full production of that type can be anticipated.

General financial observers on the make for quick profits in the aircraft industry would do well to heed the North American management admonition that ". . . today's technical success or failure cannot be read in sales charts until many years in the future."

—Selig Altschul

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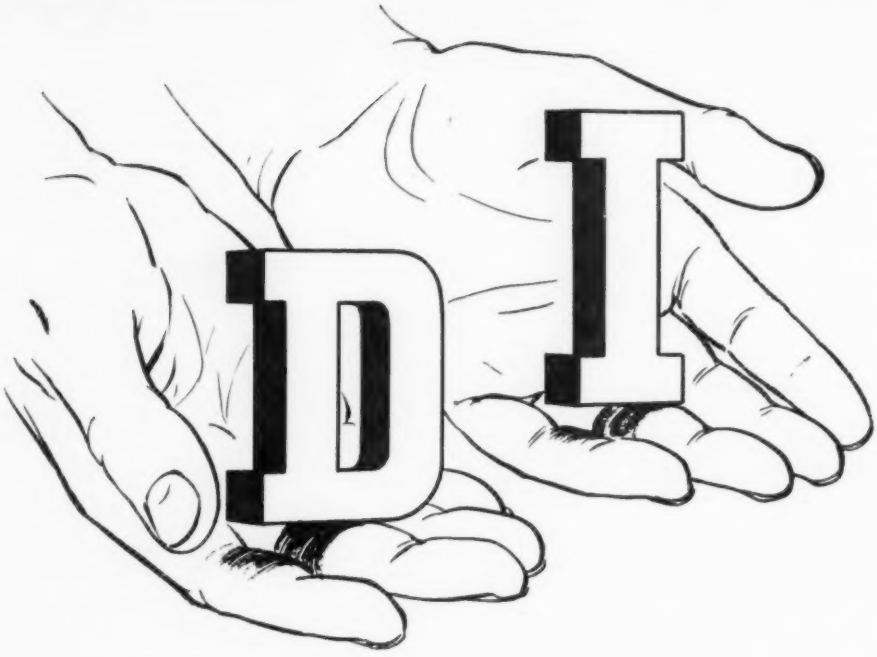

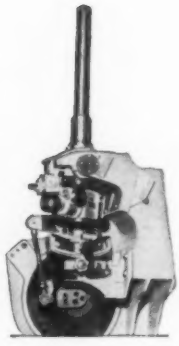

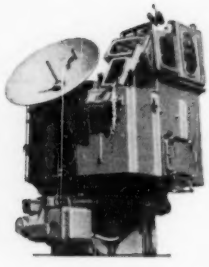

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Carriers Test New Transistorized Mike

- **Major U. S. airline tries Remler unit for more than 1,000 hours, is considering it for fleetwide use.**
- **'Transluctance' telephone-style handset is expected to offer strong competition to conventional carbon type.**

By Philip Klass

The widely used, but oft-criticized, carbon microphone may face serious competition for airline public address and radio communication use from a new variable-reluctance mike with a tiny built-in transistor pre-amplifier. The new device, developed by Remler Co., Ltd., of San Francisco, will mark the first airline use of transistors, tiny vacuum tube replacements.

▶ **Improved Fidelity**—The Remler mike offers improved fidelity and lower noise, attractive advantages in airline PA systems and air-to-ground communications.

One major U. S. airline has tested the new microphone for more than 1,000 hours in actual service and is reportedly considering a fleetwide purchase for PA use (AVIATION WEEK Jan. 4, p. 11). Another major airline has requested Remler mikes for air-to-ground radio use in its test plane. Several commercial aircraft manufacturers are also reported interested.

The Remler "Transluctance" telephone-type handset, containing a variable reluctance element and a two-stage transistor pre-amp, is directly interchangeable with presently used airline carbon-mike handsets, without wiring changes or other modifications. The Transluctance handset output signal is higher than that of a conventional T-17 carbon mike, through a wider frequency range, Remler says.

▶ **Much Criticized**—The carbon microphone, sometimes dubbed "the world's most expensive loose connection," came under fire when international airline experts gathered in Copenhagen in 1952 for an International Air Transport Assn. radio symposium. Representative comments on the carbon mike included:

• **Deterioration:** "Our experience has been that deterioration is the difficulty (in obtaining good intelligibility). . . . After the carbon microphone has been in service for a week or so, you can . . . shake it . . . and your output changes by at least 6 db."—B. F. McLeod, Pan American World Airways.

• **Distortion:** "Single button (carbon) mike produces sufficient distortion in itself to create cross-modulation before you ever get into filters . . . and (speech) clippers (making them ineffectual)."—H. A. Ferris, Trans Canada Air Lines.

• **Limited future:** "Our company has participated in a vast amount of work on microphones for aircraft and I think we can dismiss the carbon microphone completely from having any potentialities operationally greater than it now has."—J. D. Woodward, Radio Corp of America.

Despite these disadvantages, the carbon mike has enjoyed almost universal airline use in this country until recently because of its comparative simplicity and its high-level output signal.

The low signal level of the dynamic mike requires a pre-amplifier. If vacuum tubes are used, the pre-amp is so large that it must be located in the main PA amplifier or jack-box, with the risk of stray pick-up (noise) in the cable between the microphone and the pre-amp.

However, Lockheed is recommending conventional dynamic-mikes for the PA system in its Super Constellations, and practically all operators, including Eastern Air Lines and Trans World Airlines, are using them or plan to. American Airlines plans to convert its DC-7s to use dynamic mikes in their PAs.

▶ **Transistors the Answer**—The advent of tiny transistors has made it practical to build a combination mike and pre-amp into a package no larger than the carbon mike element. Transistors operate from low voltage, need no heater power, making it possible to operate the pre-amp from the same source normally used with the carbon mike.

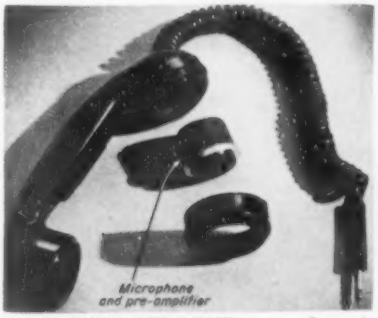
Remler quotes the following characteristics for its new Transluctance mike:

• **Frequency response:** ±6 db. between 500 and 6,000 cps., with 6 db./octave slope below 500 cps.

• **Output:** 0.778 v. rms. at 100 dynes/sq. cm. at nominal 27.5 supply, voltage. Output is down only 2 db. if supply voltage drops to 15 volts.

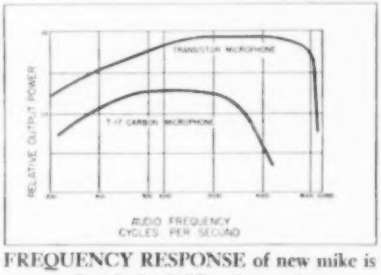
▶ **Reliability**—Mindful of early transistor troubles caused by moisture, Remler is presently using Raytheon CK721 junction transistors which are individually sealed in a glass-plastic case. For added protection against humidity, Remler encapsulates the entire pre-amp with a plastic seal coat. Should better or lower-cost transistor types become available in the future, they will be substituted for the CK721, company says.

In addition to airline usage tests, the new mike has been subjected to 16 weeks of continuous life tests, at room environment, without degradation in performance to date, according to Rem-



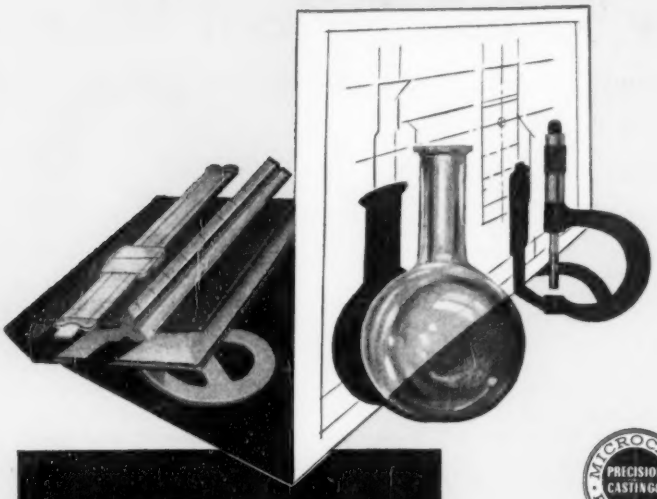
HIGH FIDELITY MIKE, using dynamic microphone element and transistor pre-amplifier can improve intelligibility of aircraft radios and airline public address systems.

TINY TRANSISTOR PRE-AMP and variable reluctance mike are housed in container no larger than the carbon microphone element the new Remler Co. unit replaces.



FREQUENCY RESPONSE of new mike is compared with the T-17 carbon mike.

A Message to Production and Design Engineers



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The MICROCAST Process of investment casting offers a flexibility in meeting design problems not possible in the past without pyramiding costs. Small parts may be designed and Microcast for economical production eliminating such operations as broaching, contour milling, grooving, and slotting. Intricate shapes, having sound structure and surface smoothness, can be Microcast with such dimensional uniformity that little or no machining is required. Write for illustrated booklet and also complete information. New Microcast color movie available for your showing.

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The Original Process for Mass Producing Precision Investment Castings

ler's A. R. Ogilvie. He also reports no ill effects after mike exposure to −60F, 125F, 95-100% humidity at 122F, and 50,000 ft. altitude.

The variable-reluctance microphone element used is one which Remler has manufactured in large quantities for Navy and Marine use, attesting to its ruggedness. All parts are designed to withstand tropical environment.

Remler is not talking about the details of its transistor circuitry, for competitive reasons, except to say that it incorporates limited provisions. The company is currently producing the new Transluctance mike in small quantities.

Company address is: 2101 Bryant St., San Francisco 10, Calif.

New Avionic Devices

A variety of new components suitable for use in avionic equipment have recently been announced. Among these:

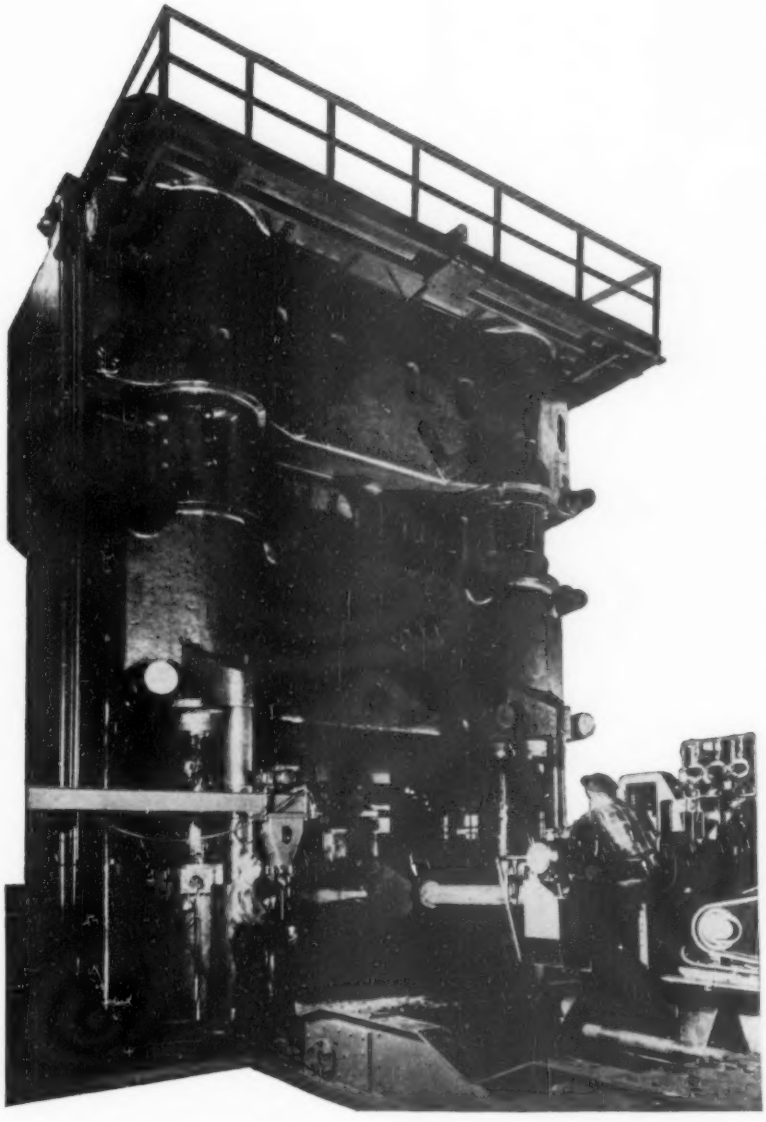
• **Highspeed relay,** MSR-100 series, operates in less than two milliseconds and employs a damping technique which virtually eliminates mechanical chatter, manufacturer says. New relay operates at −55C, comes in SPDT style, with contact rating of 2 ma., operating coil current of 13 ma., housed in a hermetically sealed, plug-in container. Electronics Division, Iron Fireman Manuf. Co., 2838 SE Ninth Ave., Portland 2, Ore.

• **Wide-range RF inductor,** Type 6XBK2, can be used to vary oscillator frequency of a sweep generator over the range of 4 to 220 mc. Trade named the Increductor, device has one control

winding which varies inductance of four output windings covering the required frequency band. CGS Laboratories, 391 Ludlow St., Stamford, Conn.

• **Coreless power resistor,** whose windings are completely enclosed in ceramic, is said by General Electric to be up to 50% lighter than conventional construction and the first to meet high-temperature characteristic "V" of MIL-

FORGED
by Alcoa!



Lifted from a nearby preheating furnace by a giant manipulator, a 350-pound forging blank is brought into position between the polished dies mounted in the huge Schloemann press. Then, 15,000 tons of pressure flow the metal into a strong, complex shape—*another quality Alcoa® Aluminum Forging!*

The difference between this forging and others is more than a difference of size. The man at the manipulator, the man at the press control board are members of an Alcoa team which has had more aluminum forging experience than any other in the country. The alloy was developed, the dies were designed, and the metal-working temperature was selected by other members of this same Alcoa team.

As load requirements mount, aluminum forgings become the obvious choice in more and more aircraft applications. Your nearest Alcoa sales office—listed under "Aluminum" in your telephone book—is your short cut to 65 years of aluminum know-how. Aluminum Company of America, 1800-A Alcoa Building, Pittsburgh 19, Penna.

Alcoa brings the world to your armchair with "SEE IT NOW" featuring Edward R. Murrow, Tuesday evenings on most CBS-TV stations.

ALCOA ALUMINUM

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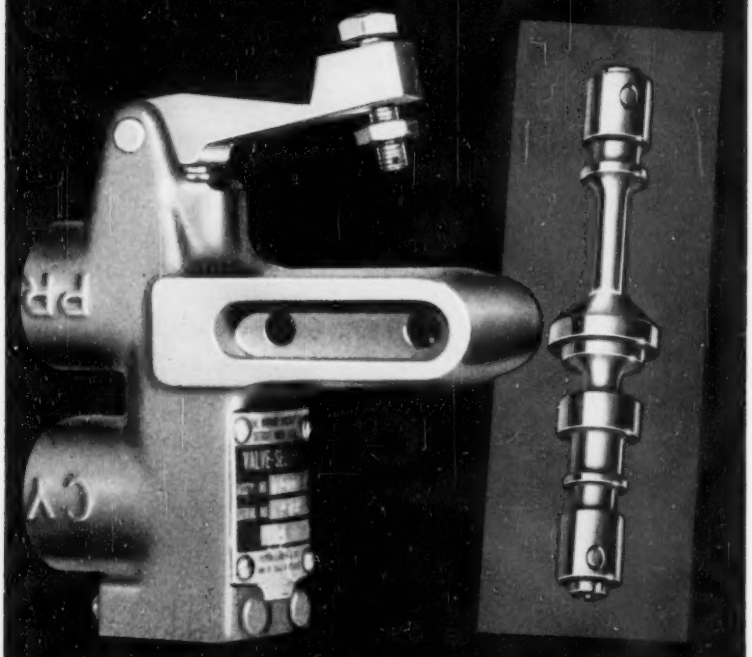
Warner SEQUENCE VALVES

Warner Sequence Valves, designed for any system pressure up to 3000 psi, are adaptable to a wide range of hydraulic applications. These economically priced valves have low leakage and low operating force characteristics.



SOMETHING MORE THAN ACCURACY

Precision machining ability involving special lapping techniques to hold extremely close tolerances is only a part of the story behind Warner Hydraulic Equipment.

For many years Warner has specialized in the design, development and manufacture of precision hydraulic equipment. As a result of this comprehensive experience Warner is well qualified to assist you in the development of special hydraulic equipment to meet your particular requirements.

* We invite you to utilize Warner's specialized experience in the field of hydraulics by giving our engineers and laboratory technicians an opportunity to work with you in the early stages of design and development.

Send today for your copy of an illustrated folder describing typical examples of Warner Hydraulic Equipment.

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R-26B. New resistor will be available in MIL types RW29-35, from components dept., Electronics Division, General Electric, Syracuse, N. Y.

• **Crystal,** G-9 series, available with flexure modes of 4 to 80 kc., for providing precise frequency control at temperatures of −40 to 70C. Crystals are hermetically sealed in plug-in base glass enclosures. James Knights Co., Sandwich, Ill.

• **Time-delay relay,** Type SF, has pneumatically controlled time delay, externally adjustable over range of 30 milliseconds to more than one minute. Device operates from 28 v.d.c., comes in double-throw, single, double, or three-pole styles, in hermetically sealed case measuring 2¼ in. square, 4 in. high. Weight is 1.2 lb. AGA Division, Elastic Stop Nut Corp. of America, Elizabeth, N. J.

• **High-temp. linear pot,** Model LCZ, capable of operating at temperatures of −85F to 600F, rated 5 watts, is available with linear slide travels of ¼ to 10 in., and resistances up to 450,000 ohms /inch. Standard linearity is 0.5%, but units can be obtained with 0.1% linearity. Galetronics Inc., 2607 E. Foothill Blvd., Pasadena 8, Calif.

Small Computers Fit on Desk Top

Desk-top analog computer, measuring only 20x25x20 in., is capable of solving sixth-order differential equations, Reeves Instrument Corp. announces.

The new small Reac is available in two models: C301, requiring external problem control, and the C302 with built-in problem control. Both have built-in power supplies for amplifier and relay operation and an internal computing reference source. Problems are set up on removable patch boards.

Both models have 12 individually chopper-stabilized computing amplifiers, identical to those used in latest full-size Reacs, with a drift of less than 0.25 mv./day and d.c. gains of more than 15 million, Reeves says. Operations are performed with accuracy better than 0.1%, according to company.

Reeves Instrument Corp., Dept. 4, 215 E. 91 St., New York 28, N. Y.

Need small bearings that can carry heavy loads?

here's how manufacturers of materials handling equipment get them with NEEDLE BEARINGS

Leading manufacturers of lift trucks, industrial trolleys and conveyors, cranes, hoists and other types of materials handling equipment specify Torrington Needle Bearings because of their high capacity and their compactness.

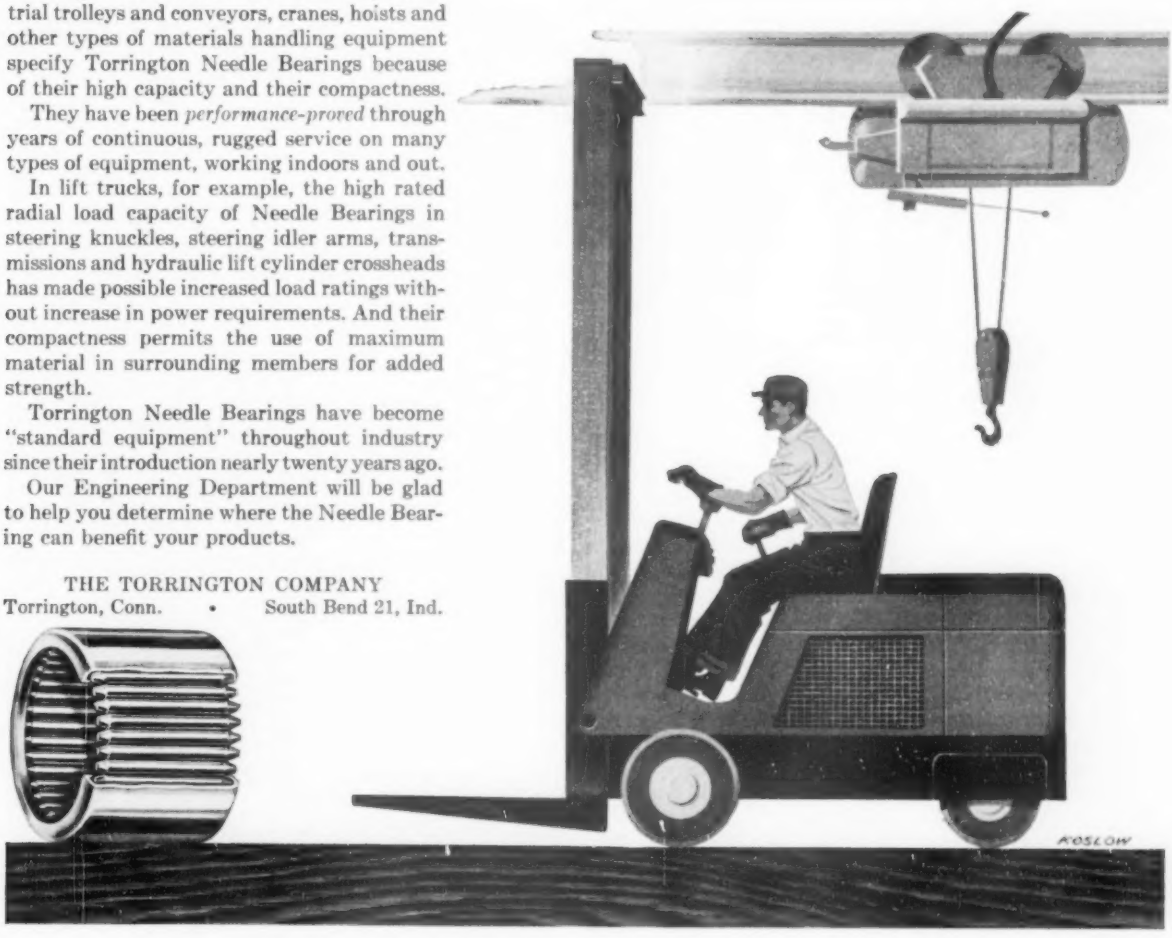
They have been *performance-proved* through years of continuous, rugged service on many types of equipment, working indoors and out.

In lift trucks, for example, the high rated radial load capacity of Needle Bearings in steering knuckles, steering idler arms, transmissions and hydraulic lift cylinder crossheads has made possible increased load ratings without increase in power requirements. And their compactness permits the use of maximum material in surrounding members for added strength.

Torrington Needle Bearings have become "standard equipment" throughout industry since their introduction nearly twenty years ago.

Our Engineering Department will be glad to help you determine where the Needle Bearing can benefit your products.

THE TORRINGTON COMPANY
Torrington, Conn. • South Bend 21, Ind.



TORRINGTON *NEEDLE* BEARINGS

Needle • Spherical Roller • Tapered Roller • Cylindrical Roller • Ball • Needle Rollers

Trade-marks of leading materials handling equipment manufacturers who use Needle Bearings in their products.

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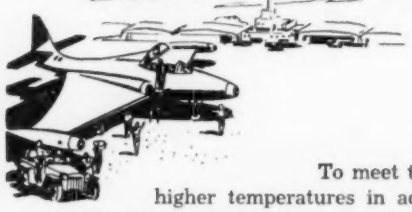
WHITING
Automatic ELECTRIC TRUCKS
MERCURY

for today's "hotter" jets, *South Wind* presents...

new lightweight, thinwall

stainless steel heat exchangers*



To meet the challenge of higher temperatures in advanced jet engines, South Wind has developed new lightweight, thinwall stainless steel heat exchangers. These heat exchangers fully comply with the rigid specifications set up by airframe and engine manufacturers, as well as the makers of air cycle cooling packages.

In addition to stainless steel, thinwall aluminum heat exchangers also are being designed and fabricated at South Wind for many different applications. Heat transfer from air-to-air, liquid-to-liquid, and air-to-liquid is being achieved effectively with the new South Wind heat exchangers, which utilize either the tube bundle or the plate and fin types of design . . . whichever the job requires.

*Illustrated here is a thinwall stainless steel tube bundle heat exchanger

For Aircraft Heating OR Cooling

Pioneers in the field of aircraft heat exchange equipment for providing heat, South Wind has now put that experience to work in the development of heat exchangers for cooling purposes . . . another service to the aircraft industry.

"Can Do!"

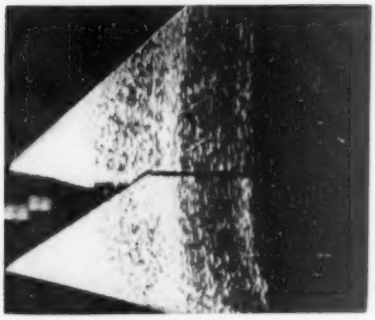
Whatever *your* need in heat transfer equipment, South Wind's experienced engineering staff will be glad to consult with you. For information, write Stewart-Warner Corporation, South Wind Division, 1514 Drover Street, Indianapolis 7, Indiana.

South Wind

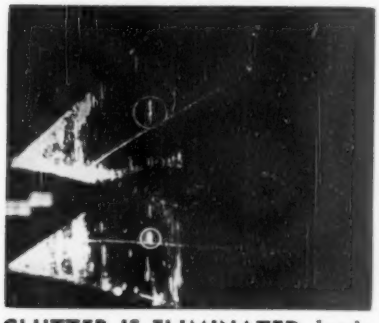
A PRODUCT OF SW STEWART WARNER

AIRCRAFT HEATERS
HEAT EXCHANGE EQUIPMENT
INERT GAS GENERATORS

Spot Remover



HEAVY RAINSTORM normally produces this kind of clutter on a precision approach radar scope because radar energy is reflected by raindrops. In photo shown, the clutter completely obscures a T-33 jet airplane only 1½ miles away.



CLUTTER IS ELIMINATED largely, showing T-33 blip clearly (circles), by giving radar energy circular polarization. Reason is that circular polarized radar echos from raindrops are unable to enter the radar antenna.

CIRCULAR POLARIZATION is introduced on the azimuth antenna of the Gilfillan Bros. CPN-4 approach radar by means of a small grid which operator can lower in front of antenna feed horn during a heavy rain. Grid converts normal horizontal polarization to circular polarization.

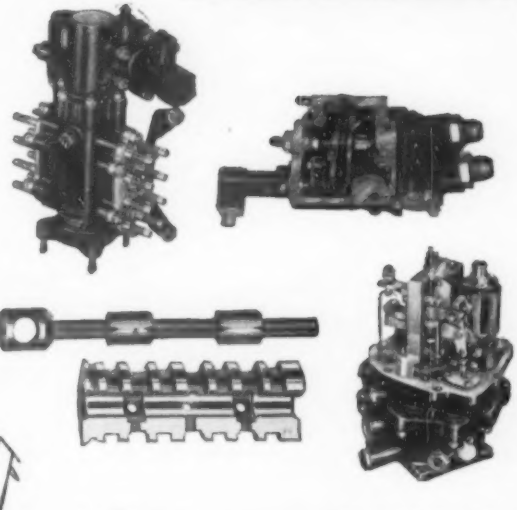
New Microwave Test Equipment

Several types of microwave test equipment for laboratory and/or field use recently have been announced. The list includes:

• **VSWR meter.** Model 110A, X-Band

jet

fuel controls
precision parts
and assemblies



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Today, much of America's finest power-driven equipment . . . many of her speediest turbojets . . . are equipped with intricate, precision control mechanisms bearing the PIERCE Mark of Quality.

Pierce experience and facilities are available to *you* in the production of component parts for jet aircraft engines . . . design, fabrication of parts, precision machining and/or assembly, to your specifications.

Seasoned engineering talent, modern, fully-equipped plants, skilled personnel and rigid quality control practices assure workmanship of the highest order—at the greatest economy consistent with PIERCE quality standards.

Engineering service is available. Your inquiry will receive the immediate attention of a qualified representative.

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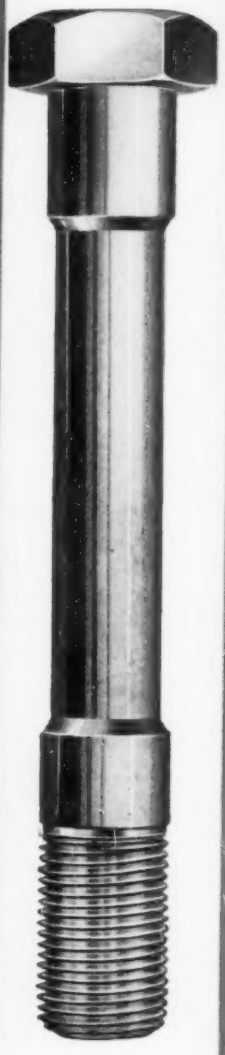
rule of thumb

more inspection less rejection

Progressive inspection is the rule at Cooper. Each run of fasteners is checked in and out of each successive operation. There can be no gaps in quality control where aircraft safety and progress are concerned.



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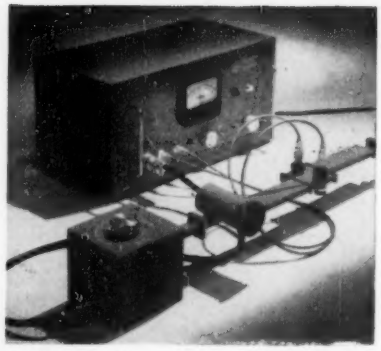

voltage standing wave ratio indicator, covering frequency range of 8.5 to 9.6 kmc., includes oscillator, and a wavemeter for accurate frequency settings. Wavemeter is reportedly accurate to within 1 mc. and overall instrument accuracy is 2%. VSWR range of 1.06 to 2.5 is covered in two scales. Manufacturer is Color Television Inc., 913 E. San Carlos Ave., San Carlos, Calif.

• **Signal and sweep generators.** Model MSG-4 signal generator, covering the frequency range of 7 kmc. to 10.75 kmc., and another model covering 15.75 to 16.25 kmc., are now available from Polarad Electronics Corp. Both units have provisions for internal pulse or FM modulation as well as for external modulation. Company has also announced an X-band sweep generator, which varies RF energy continuously between 8.5 and 9.6 kmc. at a rate of 12 cps. Dual-sweep display unit allows both reflected and transmitted energy to be viewed simultaneously. Company address is 100 Metropolitan Ave., Brooklyn 11, N. Y.

• **Wavemeter.** Model WIN6AA, compact survey-type unit indicates wave-

IRE Avionics Days

Aviation Electronics Days, consisting of three full technical sessions and a special luncheon, have been scheduled for Mar. 22-23 during the national convention of the Institute of Radio Engineers in New York to commemorate the 50th anniversary of powered flight. Plans for the event, in which the Institute of the Aeronautical Sciences will participate, were announced by Dr. K. C. Black, chairman of the professional group on Aeronautical and Navigational Electronics (formerly Airborne Electronics).

Fifteen technical papers, most of them on avionic subjects, are scheduled for presentation, beginning Monday afternoon, Mar. 22. Both Tuesday sessions and the luncheon will be held at the Hotel Shelton, 49th St. and Lexington Ave.

. . . with Johns-Manville THERMOFLEX BLANKETS

The North American Sabre Jet, powered with the General Electric J47 turbojet engine, has flown through the test of combat with highest honors.

THIS PRODUCTION LINE SCENE in the North American Aviation plant at Los Angeles shows Thermoflex* Insulation Blankets being applied to tail pipes of North American Sabre Jets on order for the United States Air Force.

Now standard protection for many Air Force and Navy jet aircraft, these flexible blankets insulate and protect the airframe against searing heat generated by jet power.

Thermoflex Blankets are custom-fabricated with highly stable Thermoflex RF Felt. Developed by Johns-Manville Research and Insulation Engineers, this time-tested refractory fiber felt is sealed between sheets of corrosion-resistant metal foils. In manufacturing Thermoflex Blankets to specification, careful attention is given to the accuracy of cutouts for engine supports, actuator mountings, fuel lines, thermocouple leads and other controls. The precision-formed grooving and edges of the blanket . . . the close fit at cutouts . . . maintains maximum insulation value for the entire application. Furthermore, edges at cutouts are suitably sealed to prevent fuel penetration into the insulation felt.

In addition to insulating tail pipes, engine cones, turbine casings and afterburners . . . Thermoflex Blankets in special preformed shapes are used to insulate, protect, and fireproof fluid storage tanks, air-conditioning systems, thermal de-icing ducts and many other assemblies in all types of aircraft.

Why not send for your free copy of the illustrated folder IN-136A? It tells the complete story of Thermoflex Blankets for aircraft power plants and airframes. Address Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

*Reg. U.S. Pat. Off.

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. . . for 3 ENGINEERS!

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At our Air Arm Division, where the first rate-type interceptor autopilot employing magnetic amplifiers was designed, top design engineers work on computer, autopilot and radar systems in the midst of the most complete research and test facilities that money can buy.

Air Arm is a multi-million-dollar company-owned division devoted to the development and production of the best products in the aviation-electronics industry. It is located adjacent to Friendship International Airport, one of the finest in the country.

The long list of aircraft armament products currently being developed and produced at Westinghouse Air Arm has created a need for outstanding engineers who can meet the challenge of this stimulating new work. The men we want will build for themselves key positions in an organization where the future is unlimited.

Salaries are open, depending upon training, experience and ability. In addition to a highly respected patent-award plan and opportunities for advanced study and degrees, Westinghouse offers all the usual employee benefits, plus!

Write for information today!

RADAR CIRCUIT DESIGN ENGINEER

Duties: Applied research, development and design of airborne radar equipment including receivers, indicators, modulators, range-tracking units and MTI for fire control and missile guidance systems.

Requirements: Minimum of two years experience, and a BS degree in Electrical Engineering.

SYSTEMS ANALYSIS ENGINEER

Duties: Automatic aircraft and missile control systems analysis. Determination of armament systems configurations and equipment characteristics. Analytical development of autopilot, radar, fire control and turret systems.

Requirements: BS or MS degree in Electrical Engineering, Mechanical Engineering, or Physics, and experience in the same or allied fields.

HYDRAULICS ENGINEER

Duties: Analysis and design of hydraulic valves, systems, actuators and servomechanisms as applied to aircraft and missile guidance and control.

Requirements: Three or more years experience in allied field and a BS or MS degree in Engineering.

To apply send resume of education and experience to

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Employment Supervisor, Dept. J.2.
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BALTIMORE, MARYLAND

length directly in centimeters on a digital counter. Instrument range is 6-60 cm. Thompson Products, Inc., Electronics Div., 2196 Clarkwood Road, Cleveland 3, Ohio.

FILTER CENTER

▶**Surface-Barrier Silicon Transistors**—Philco has reportedly discovered a nontoxic solution capable of etching silicon, thereby opening the way to the manufacture of high-temperature silicon transistors by its newly developed "surface-barrier" technique (AVIATION WEEK Jan. 4, p. 50). Two liquids, one for etching and the other for eletroplating transistor electrodes, are required. With germanium, a single solution can be used for both steps in the process.

▶**IRE Plans Management Course**—IRE's professional group on engineering management has scheduled a second series of 15 weekly group discussions on the subject of "Engineering Management in the Electronics Industry," to begin in March in Los Angeles. First management course, now underway, was oversubscribed, has representatives of 27 electronic companies in the area.

▶**RADC Tries DME Modification**—USAF's Rome Air Development Center is trying its hand at modifying a Civil Aeronautics Administration DME ground station to determine problems involved in converting present civil DME to new military system. (AVIATION WEEK, Dec. 7, p. 40).

▶**A. V. Roe Adds Computers**—A. V. Roe Canada Ltd., Toronto, which makes the CF-100 fighter and Orenda jet, has expanded its computing facilities with addition of two U.S.-built machines, at cost of $130,000. One is a Cadac 102A digital computer, built by Computer Research Corp.; the other is a Boeing Airplane Co. analog computer.

▶**Device to Probe Terrestrial Field**—Minneapolis-Honeywell has developed a 6½-lb. device to enable Air Research & Development Command's Cambridge Research Center to measure terrestrial electrical field between earth and ionosphere, which begins between 60-80 miles above the earth. Objective is to get data which may explain source of 1,800-amp. current which is constantly flowing toward the earth. M-H aerial electrometer, which measures electric currents as low as $\frac{1}{10}$ of a micromicroampere, will be carried aloft in balloons to report on electrical conductivity, air temperature and pressure.

—PK

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Located in the Industrial Heart of America the newly established Cleveland (0) Division of Stillman Rubber Co., brings faster deliveries and on-the-spot engineering counsel to Middle Western and Eastern manufacturers.
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A serious misconception has come about concerning our firm.

It seems many people, including some of our customers, think we do only X-Ray testing. This just isn't so. We have a complete quality control laboratory that is fully equipped to do spectrographic, metallurgical, physical and chemical testing on any material. Furthermore, our staff is made up of experienced technicians who are acknowledged specialists in the field of quality control. We offer you the opportunity of having all your testing done by one laboratory. Which is easier for you . . . and much more economical and efficient.

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WHAT'S NEW

New Publications

A Spanish edition of a lexicon of aviation terms published by International Civil Aviation Organization has been issued. The Spanish version, titled "Lexico de terminos usados en aviacion civil internacional," contains some 3,000 terms commonly used in Spanish, with English and French equivalents. Price for the volume is $1.75. Orders may be placed with ICAO at Montreal; Her Majesty's Stationery Office, London; or ICAO regional offices in Lima, Cairo, Melbourne and Paris. Payment should be in the currency of the country where the sales agent is located.

Aircraft Design Through Service Experience, CAA Technical Manual No. 103, presents unsafe design practices which have resulted in accidents, malfunctions, defects and hazards. In each case the corrective action taken is given. Write Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $1.25.

Pilot's Radio Handbook, CAA Technical Manual No. 102, is a 122-page publication explaining in non-technical language operational use of navigational aids available to pilots having two-way radio. It includes information on omnirange, flight assistance service, low- and medium-frequency ranges, control tower procedures, radio weather and en route radio-telephone procedures. Write Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 45 cents.

Telling the Market

Illustrated 4-page folder issued by Branson Instruments, Inc., 430 Fairfield Ave., Stamford, Conn., presents specification tabulation of company's **ultrasonic test instruments,** featuring such topics as application, range of thickness, accuracy, and physical and electrical characteristics. . . . Folder, issued by DeWitt Equipment Co., 136 Lafayette St., New York 13, N. Y., gives complete specifications on a line of **lathe chucks,** including medium-duty three-jaw universal, four-jaw independent, heavy-duty turret lathe, heavy-duty Tudor concentric steel body, medium-duty four-jaw universal and threaded back plate chucks, all British imports. . . . Pantex Manufacturing Corp., Pawtucket, R. I., is offering a new bulletin covering its line of **industrial hydraulic relief valves,** describing in detail the pilot-operated valves available in four sizes from ¼ in. to ¾ in.

BARBER COLMAN

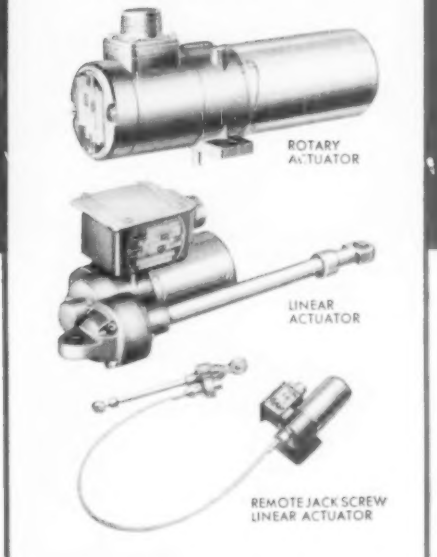
Aircraft Controls

precise circuit sequencing for missile launching with custom-engineered program motor assembly

Here's another example of how Barber-Colman Company's custom-engineering service and production facilities can meet the exacting requirements of aircraft and missile manufacturers. This program motor assembly takes just about two seconds to perform its function in a missile launching operation . . . it's a small device, weighs little . . . yet the job it does is mighty important. There can be no question about this unit's reliability . . . there's no room for failure! If you have design problems calling for special applications of program devices, actuator assemblies or other control systems, let Barber-Colman engineers help you solve them with custom-engineered units to fit your exact needs.

SPECIAL PROGRAM MOTOR ASSEMBLY drives four potentiometers for circuit sequencing in a missile just prior to launching. Assembly includes a 90 volt d-c permanent magnet motor with gear train, slip clutch and limit switches. Size: 2" x 2" x 7". Weight: approximately 1.8 lbs.

BARBER-COLMAN ACTUATORS



Barber-Colman Company offers a wide variety of actuators for control of various components on today's complex aircraft and missiles. Rotary and linear types, as shown at left, combine gear reductions, switching, mounting details, and other design features to meet most applications in their load-speed class. The complete line of Barber-Colman aircraft controls also includes: Valves; Positioning Controls; Temperature Controls; Small Motors; Ultra-Sensitive Relays; Thermo-Sensitive Elements. *Write for Catalog F1141.* Engineering sales offices in Los Angeles, Seattle, Baltimore, New York, Montreal.

Canadian Aircraft Representative
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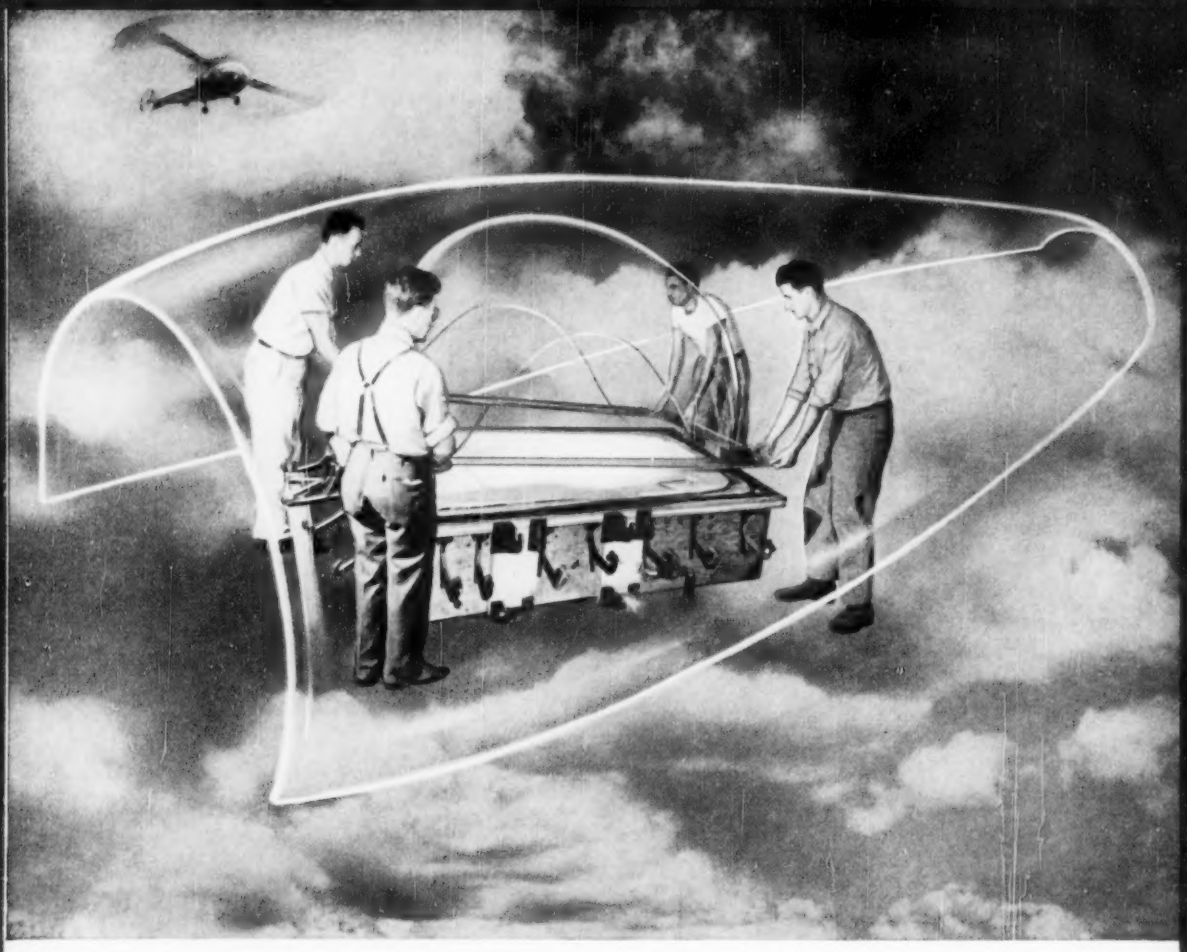

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Representatives in principal foreign countries

DEDICATED TO THE 50TH ANNIVERSARY OF POWERED FLIGHT

WHO'S WHERE

(Continued from page 10)

Changes

Frederick H. Pollicutt is new chief designer for Percival Aircraft, Ltd., Luton, Bedfordshire, England.

Edward G. Conway has been promoted to works manager for Kaman Aircraft Corp., Bloomfield, Conn.

C. T. Reid has become public relations director for Grand Central Aircraft Co., Tucson, Ariz.

John B. Crosby has been appointed advertising manager for Crouse-Hinds Co., Syracuse, N. Y.

William C. Gage has been promoted to sales manager for Flexonics Corp., Aircraft Division, Maywood, Ill.

F. J. Hughes is new director of contracts at Washington, D. C., for Avco Manufacturing Corp.'s Appliance and Electronics Division, Los Angeles. Other appointments: **D. B. Mason**, engineering director; **H. L. Brouse**, director of products; **S. W. Sorensen**, contract manager.

J. Parker Van Zandt has joined the international staff of North Atlantic Treaty Organization as an aircraft production specialist.

James A. F. Montgomery has been promoted to U. S. passenger sales manager for Pan American World Airways.

Elmer J. Basey has been appointed U. S. sales manager for Japan Air Lines.

Laurence W. Harry has taken a leave of absence as contracts administrator for Bill Jack Scientific Instrument Co., Solana Beach, Calif., to join the Office of Defense Communications as assistant director of telecommunications.

R. E. Peterson, former San Francisco personnel manager for United Air Lines, is new personnel director for the government's Foreign Operations Administration.

Jack L. Mustard has become assistant general sales manager of Ex-Cell-O Corp.'s Industrial Division, Detroit.

Thomas McCracken has been promoted to base administrator at Northrop Aircraft's Palmdale Airport facility at Hawthorne, Calif. **William H. Renison** is new coordinator of the Palmdale project.

Lee R. Urquhart has been named superintendent of purchasing and stores for Pioneer Air Lines, succeeding **Charles E. Moffat**, who has resigned to enter private business.

John W. Bruce, Jr., is new special technical sales representative-aircraft for Rubber & Asbestos Corp., Bloomfield, N. J.

Donald B. Morse has become sales manager of the Scintilla Division of Bendix Aircraft Corp., Sidney, N. Y.

Edward N. Townsend has been promoted to works manager for Lockheed Aircraft Service-International, New York. **Mark J. Maidel** is production superintendent in charge of material, production and plant engineering.

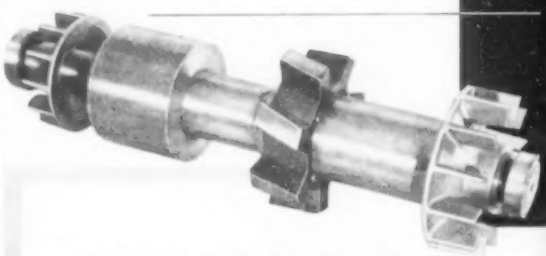
William C. Burt, counsel for Transport Air Group, has formed a law firm with Bernard Koteen in Washington, D. C.

Dr. F. S. Adams is new flight surgeon for American Airlines' western region headquarters in Los Angeles.

Trouble-Free 400 Cycle* Power Supplies

with American Electric Inductor Alternators

The Alternator with No Wear Points!



This is the complete rotating member of an American Electric Inductor Alternator with 2 bearing common-shaft motor drive. Note absence of coils, slip rings, brushes etc. Ball Bearings are the only wear points.

Most rotary electrical equipment is subject to wear... *in windings, slip rings, brushes, springs or other working parts.* But here's an alternator with *NO WEAR POINTS* other than two ball bearings! Even these are grease-sealed; lubricated for life.

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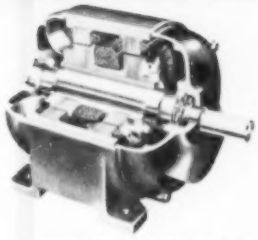

Here's how the American Electric Inductor Alternator is built. Note all windings are stationary. Output is taken directly off stationary windings. Even the excitation is fed to a stationary winding (center coil)!

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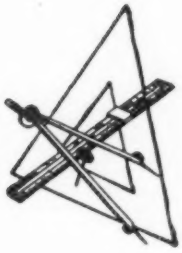

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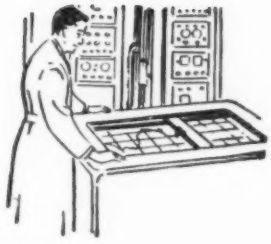

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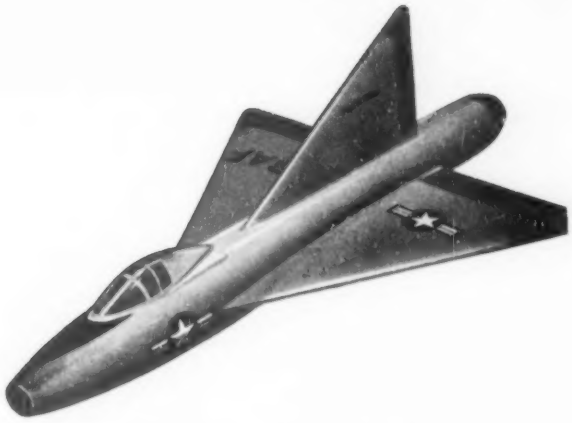

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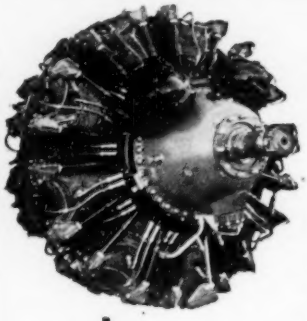

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Description	Mfg.	Part No.	Quan.
Heater	Surface Combustion Co.	83A9	6
Heater	Stewart Warner (200,000 BTU)	921B	230
Blower	Dynamic Air Engine	4582-AA-6C	18
Blower	Joy Manufacturing Co.	U-702-15	24
Tank Unit	Minn. Honeywell	G-1098D	11
Trim Tab Controller	Pioneer	#15701-R	20
Oil Cooler Assembly	U.A.P.	U8416-MM	12
Oil Cooler Assembly	U.A.P.	U8013-MM	14
Hydraulic Pump	Vickers	MF9-713-15H	120
Hydraulic Pump	Vickers	PF12-713-25BCE	124
Hydraulic Pump	Vickers	PF4-713-20BCE	327
Hydraulic Pump/ 3000 P.S.I	Vickers	MF45-3911-20Z	43
Hydraulic Cylinder	Air Associates	HC2109	29
Hydraulic Cylinder	Air Associates	HC2110	8
Fire Detector	Edison	117-47	46
Fire Detector	CO_2 Mfg. Co.	ASDC2	65
CO_2 Cylinders	Kidde	981980	185
CO_2 Cylinders	Kidde	M870036B	47
Anti-Icer Pump	Adel	D7818	125
Auxiliary Power Unit	Eclipse	NEP-2	29
Auxiliary Power Unit	Lawrence	LER-30D	16
Pump	Pesco	1EAR-2808H	15
Pump	Pesco	1E-621	8
Pump	Pesco	2E2958A	21
Separator	Pesco	3V-217-HC	32
Accumulator	Vickers	AA14002A	35
Actuator	Air Associates	M-2031	22
Wobble Pump (D-3)	Erie Meter	AN4014	17
Oxygen Cyl.	Kidde	923748	74
Windshield Wiper Kit	Marquette	K14949E	140

ENGINE ACCESSORIES

Starter	Eclipse	1416-12E	75
Generator	Eclipse (NEA-3A)	716-3A	100
Starter Motor	Jack & Heinz	JH950-R	90
Generator	G.E.	2CM46A2	4
Generator	Eclipse	1003-4	71
Carburetor	Stromberg	PD12K10	550
Carburetor	Stromberg	PR48-A1	236
Carburetor	Holley	1685-HAR	90
Carburetor	Holley	1375-F	19
Magneto	Scintilla	SF9-LN-2	407
Fuel Pump	Pesco	2P248EB	6
Fuel Strainer	U.A.P.	U635A	76
Governor	Woodward	5x18	10
Prop. Reversing Control	Ham. Standard	7240)	20
Oil Separator	Eclipse	564-2A	384
Oil Filter	Purolator	27314	100
Pressure Relief Valve	Aerotec	V301B7	20
Tachometer	Eclipse	2227-11-D3A	11
Vacuum Pump	Eclipse	610-2C	6
Spark Plugs	Aero	LS4-AD1	185,000

AIRCRAFT ENGINES & PARTS

Engine	Wright	R-1820-52	1
Engine	Wright	R-1820-54	16
Engine	Wright	R-1820-60	4
Engine	P & W	R-1830-43	1
Bearing	P & W	1045A	166
Flange	P & W	3506	500
Follower Assy.	P & W	8288	130
Blower Assy.	P & W	3M814	814
Shaft	P & W	48362	53
Shaft	P & W	48363	75
Gear	P & W	48461	390
Gear	P & W	76236	78
Bearing	P & W	84289	1178
Housing	P & W	84487	113
Nose Housing	P & W	84591C	77
Crankcase Assy.	P & W	84350-D	200
Pump Assy.	Wright Aero	420313	33
Drive Assy.	Wright Aero	416421	46
Q.E.C. Unit		FM1	36

AIRCRAFT ENGINES & PARTS (Cont.)

Description	Mfg.	Part No.	Quan.
Q.E.C. Unit		PY4M(B24)	17
Bearing	Torrington	NR6L12	25790
Bearing	Fafnir	AN200-K3L2	18273

GAUGES

Compass	Eclipse	36001-0	20
Gyro Indicator	Eclipse	14601-1F-B1	11
Gyro Indicator	Eclipse	10078-1AG	62
Position Indicator, Wheel & Flap	Weston	AN5780-2	400
Position Indicator, Wheel & Flap	G.E.	AN5780-2	1000
Position Indicator, Wheel & Flap	Eclipse	20100-11C-4-A1	23
Pitch Trim Gauge	Eclipse	15100-1B-A1	19
Cowl Flap Indicator	G.E.	8DJ29AAY	21
Oil Temp. Indicator	Lewis	77C3	23
Oil Temp. Indicator	Lewis	77C4	13
Oil Temp. Indicator	Weston	828TY13Z2	71
Manifold Pressure Gauge	Manning, Maxwell & Moore	AN5770-2	28
Manifold Pressure Gauge	U.S. Gauge (Metric)	AW2-3/4-25K	146
Fuel Quantity Gauge	Eclipse	3801-3B	128
Dual Carb. Temp. Gauge	Weston	828TY12Z2	40
Carb. Air Temp.	Lewis	77C3	22
Carb. Air Temp.	Weston	119862	40
Air Temp. Gauge	Weston	727TY70Z2	11
Air Temp. Gauge	Weston	727TY72Z2	85
Air Temp. Gauge	Weston	727TY73Z2	88
Air Temp. Gauge	Weston	727TY74Z2	83
Air Temp. Gauge	Weston	728-40Z2	10
Air Temp. Gauge	Weston	727-TY37P	298
Air Temp. Gauge	Lewis	47B22	33
Air Temp. Gauge	Lewis	47B23	28
Air Temp. Gauge	Lewis	47B24	54
Air Temp. Gauge	Lewis	47B21	30
Cylinder Head Temp.	Lewis	76B19	8
Torque Indicator	Eclipse	20100-42B-14A2	9
Tachometer Indicator	G.E.	8DJ13ABK	6
Tachometer Indicator	Eclipse	2222-1F-2A	200
Magnesyn Pos. Indicator	Eclipse	20000-8A-14	9
Magnesyn Transmitter	Eclipse	20000-43A-13A1	8
Magnesyn Indicator	Eclipse	23000-2A	67
Pressure Transmitter	Eclipse	22101-11-A4	15
Pressure Transmitter	Giannin	47114-D2.0-20	8
Differential Pressure Gauge	Kollsman	906-6-011	22
Differential Pressure Gauge	Kollsman	254BK-6-052	48

AIRCRAFT (RADIO)

Transmitter	Bendix Radio	TA-12B	20
Receiver	Bendix Radio	RA10-DB	35
Amplifier (PB10) W/EDs Mount	Eclipse	15401-1	10
Amplifier	Eclipse	12086-1C	11
Radio Noise Filter	G.E.	1C-200	740
Radio Noise Filter	G.E.	NF10084	959
Tube		JAN6AL5	327
Standing Wave Ind.	Hewlett Packard	415A	3
Antenna Switch	Bendix Radio	MS49A	26
Control	Bendix Radio	3616	81
Station Box	Bendix Radio	3620	23
Insulator	Bendix Radio	MT48C	518

ELECTRICAL PARTS

Transformer	Eclipse	DW33	11
Transformer	Eclipse	DW28	80
Transformer	Eclipse	DW47	33
Transformer	G.E.	70G3	26
Servo Motor	Transicoil	#1300-20	57
Motor	G.E.	5BA40NJ1A	425
Motor	G.E.	5DP65-MB1	189
Motor	G.E.	5BA25D-J4B	44
Motor	Airesearch	26675	25
Motor	Diehl	FD65-5	21
Circuit Breaker	Spencer	PM-5	2094

ELECTRICAL PARTS (Cont.)

Description	Mfg.	Part No.	Quan.
Circuit Breaker	Spencer	C6363-1-5A	115
Circuit Breaker	Spencer	C6363-1-2A	115
Circuit Breaker	Heinemann	AM1614-80	1700
Circuit Breaker	Cutler Hammer	6141-H69A	237
Amplidyne	G.E.	5AM31JJ9A	31
Amplidyne	G.E.	5AM31NJ10	111
Switch	Kidde	A-4614	151
Ignition Switch	Scintilla	AN3913-1	70
Ignition Switch	Nesco	A-994-3226)	250
Master Switch	Jos Pollack	M869A	66
Thermo Switch	Fenwall	17392-2	126
Heater Control Switch	White-Rodgers	1033-4E1	287
Air Ram Switch	Minn. Honeywell	PG208AS1	148
Air Ram Switch	Minn. Honeywell	PG208AS7	40
Pressure Switch	Aerotec	M-101-B	20
Pressure Switch	Eclipse	3135-11C	88
Impact Switch	Kidde	SA/3A	18
Switch	C.H.	8909-K99	2000
Dome Light	Grimes	AN3096-4	2585
Dome Light	Grimes	AN3096-5	775
Dome Light	Grimes	AN3096-6	1365
Plug	Cannon	NAF310310-4B	2747
Plug	Cannon	NAF310310-5B	402
Relay	Leach	7964-404	47
Relay	Leach	7910	24
Relay	Allied	BOBX-2	31
Relay	Square D	89A	718
Relay	G.E.	CR9701-G100-K4	281
Relay	G.E.	CR9702F101-A3	626
Relay	Guardian	G34464	41
Relay	Guardian	G31502-A	350
Relay	C. P. Clare	D9060	45
Control Box	Vapor Car Heating Co.	9804B	34
Compensator	Vapor Car Heating Co.	468311	25
Solenoid	Interstate Aircraft & Eng. Co.	A812	202
Flex. Cable	Airesearch	25432	66
Temp. Control	Fulton Syphon	715E	52
Noise Filter	Mallory	NF3-5	500
Regulator	G.E.	3GBD1A18A	13

VALVES

Valve	Kidde	992585	326
Valve	Oh. Chem.	AN60009-1B	325
Valve	Oh. Chem.	AN60009-2A	247
Valve (3000 PSI)	Parker	2-1046-76	47
Restrictor Valve	Parker	SP4-2746-77	68
Restrictor Valve	Parker	SP4-2746-78	105
Restrictor Valve	Parker	SP4-2746-79	40
Restrictor Valve	Parker	SP4-2746-80	48
Restrictor Valve	Parker	SP4-2746-81	60
Restrictor Valve	Parker	SP4-2746-76	142
Restrictor Valve	Adel	18784	33
Cone Check Valve	Parker	PL2-2546-75	127
Cone Check Valve	Parker	PL2-2546-76	123
Cone Check Valve	Parker	PL2-2546-77	620
Cone Check Valve	Parker	PL2-2546-78	540
Check Valve	Parker	PLY-843-54	112
Check Valve	Parker	PL2-1846-77	23
Check Valve	Kenyon	19100-2-101B	67
Check Valve	Eclipse	557-5	9
Check Valve	U. S. Gauge	AW-CV-1-1	180
Valve	Parker	6-746-10	68
Valve	Vickers	AA31400	28
Restrictor Valve	Adel	18784	33
Lock Valve	Adel	12994-2	85
Brake Valve	Vickers	146102	22
Selector Valve	Parker	SP-1-445-8	7
Selector Valve	Adel	D9530	478
Selector Valve	Adel	D9530-2	668
Selector Valve	Adel	D9560-2	428
Selector Valve	Adel	D9632	179
Selector Valve	Adel	D9696	237
Selector Valve	Adel	D10044	744
Selector Valve	Adel	D10051	244
Solenoid Valve	United	37D6210 (AN4078-1)	2200
Magnetic Valve	General Control	AV1B1174	114
Throttling Valve		73-A-01	1865
Relief Valve	Airex	1265-900	240
Pressure Relief Valve	Aerotec	V301B7	20
Valve	Aero Supply	74247 (TyPH3)	814
Valve	Whittaker	AN5830-1	335
Valve	Whittaker	AN5830-6	74
Valve	Parker	AN5831-1	60
Valve	Eclipse	612-4A	130
Valve	Kohler	K1593-6D	1888
Valve (0-500PSI)	Bendix	146102	46

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Board Approves NAL Copter Experiment

- **National wins permission to operate nonsubsidized scheduled service, despite protests from other lines.**
- **Carrier will begin flying Sikorsky S-55s next week, limited to a year of tests within 150 mi. of Miami.**

By Frank Shea, Jr.

Civil Aeronautics Board has given temporary approval for National Airlines to operate passenger helicopter service starting Feb. 1 within a 150-mi. radius of Miami, paving the way for establishment of the carrier as the first non-subsidized scheduled copter operator in the U. S. (AVIATION WEEK Nov. 30, p. 29).

For the past several months, National has been using one Sikorsky S-55 in the area on a charter basis. Two additional S-55s, presently on order, will be added (AVIATION WEEK Oct. 12, p. 15). First is scheduled for delivery within two weeks, and the other should be received in March.

▶ **Conditions**—In granting approval, CAB set down these conditions:

- Permission granted for one year.
- No airport, heliport or other landing area shall be served within a 25-mi radius of point certificated to another carrier or carriers but not certificated to National.
- No part of the operation shall be underwritten with mail pay.

CAB's action comes after opposition from Eastern Air Lines, Southern Air Transport, Inc., Gulf Aircraft Corp. and Southeastern Helicopter Service, Inc., all of whom had filed documents against National's application. They had asked that it be dismissed or denied, or in event that permission was granted, similar permission be given to other carriers.

Only certificated carrier among the opposition is Eastern. Transport, Gulf, and Southeastern are not certificated, although Transport is the holder of a currently effective letter of registration as a large irregular carrier. Each of the three, however, has on file with the Board an application for certificate authorizing helicopter service for passengers, property and mail in the Miami area.

▶ **Types of Service**—The Board points out that, since the service National proposes is experimental, it is impossible to state precisely what form the operations will take. However, according to National's original application, the operation should embrace three types of service:

- Between two or more of NAL's certificated points located within the area.
- Between points within the area which National is not authorized by its certificates to serve, but which, if limited to intrastate travelers not moving as part of a through interstate journey, would not require economic authorization from the Board.
- Carrying through passengers between airport serving one of National's certificated points, such as Miami, and outlying communities within the area.

From this, the Board concludes that National could conduct certain of the services without additional authorization, emphasizing, however, that additional authority would be necessary to permit operation of more extensive service that the carrier contemplates.

In its ruling, CAB states: "Obligations imposed on the Board by the Civil Aeronautics Act require not merely the regulation of civil aviation, but in addition call for the active promotion of an adequate air transportation system."

▶ **Prior Certificates**—"Mindful of this latter responsibility, the Board has in the past by both certification and exemption authorized a wide variety of new services on a temporary and experimental basis," the order notes.

"Taking cognizance of the technical advances that have occurred in rotary-wing aircraft and the potentialities of the helicopter, the Board has already issued certificates authorizing three carriers to engage in transportation of persons, property and mail by helicopter on an experimental basis in the New York, Chicago and Los Angeles areas.

"Each of the three companies that has been given this authority engages only in these limited helicopter services and the cost to the government in supporting them through mail pay has been and is today substantial."

Up to now, the Board had not authorized helicopter operations by any certificated trunkline carrier as an adjunct of its regular services.

"As a result, the Board has no information based on experience that would indicate the cost or the especial advantages, if any, of such an operation or that would furnish the Board with a yardstick for determining its future course with respect to requests for authority to conduct certificated helicopter operations."

▶ **No Federal Cost**—CAB points out that the National experiment should make available specific cost data, supplementing that to be obtained from New York Airways, Helicopter Air Service, Inc. of Chicago, and Los Angeles Airways—present copter carriers—that will assist in formulating a sound helicopter policy.

Equally important, says CAB, is that the National service will be without cost to the government. The Board concludes: "In the absence of strong countervailing considerations that would outweigh these benefits, the Board believes that under the circumstances here it is clearly in the public interest to permit National to conduct experimental helicopter operations in the Miami area on a temporary basis."

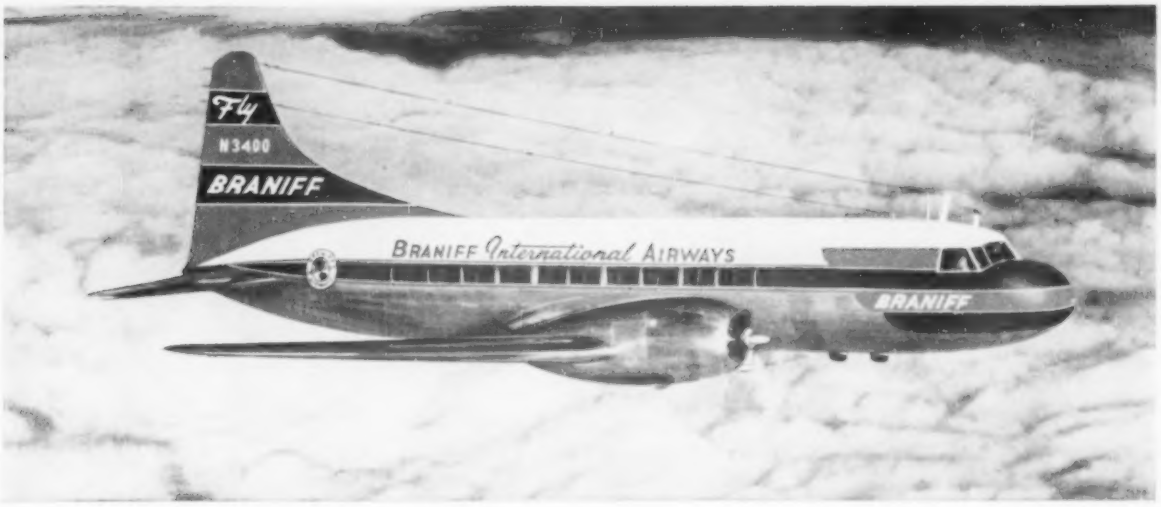
Citing that protests filed by opponents of the National proposal raise directly the question of possible adverse effects of the service upon other persons, CAB says that since no carrier has been certificated to conduct a local service or helicopter service in the Miami area, the question of competition with such carriers is not present.

Referring to possible effects on Eastern, the Board concluded that, under conditions specified, approval in National's favor will not have such adverse effects on Eastern as to warrant denial.

With regard to NAL's other three opponents, however, the Board states: "There remains for consideration a determination of the impact that this will have on the three carriers that have applications on file for certificates authorizing them to conduct helicopter operations in the Miami area.

"Clearly, a grant of National's request does not constitute any determination of the merits of those applications and will not be construed by the Board as giving National any pre-emptive rights to any certificated helicopter services that may ultimately be authorized in that area.

"On the other hand, it would be unrealistic to fail to recognize that as a practical matter the granting of National's application will place the applicants for certificates in a less advantageous position. . . . However, on



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balance, it is our opinion that the benefits that will flow from the National experiment outweigh any adverse effects it might have on other companies desirous of obtaining certificates."

An NAL official told AVIATION WEEK the carrier is "extremely optimistic" concerning success of the experiment in the lucrative Miami market, that definite schedules would be established as soon as possible after a series of trial runs throughout the area. Rate tariffs will be filed with CAB as soon as set.

The airline has similar plans for Tampa, Fla., and Norfolk, Va. Long-range plans call for eventual replacement of the seven-passenger S-55s with either the 40-passenger Piasecki YH-16 or the 35-passenger Sikorsky S-56, currently being test flown (see page 18).

Senate Group to Rewrite Air Act

Commerce committee is basing action on McCarran bill, but all other recommendations will be considered.

Senate Commerce Committee this session will tackle the involved task of rewriting the 1938 Civil Aeronautics Act, which was three years in process of enactment.

Sen. Pat McCarran's 177-page bill to accomplish the job will be the basis for hearings, but all other recommendations will be considered. McCarran, co-author of the 1938 act, is not committed to all provisions of his bill and has invited suggestions.

Rep. Carl Hinshaw's bill, proposing creation of a five-member civil aeronautics commission in lieu of CAB and putting CAA under an undersecretary of commerce for air services, may be introduced on the Senate side and considered along with the McCarran bill.

► **Major Proposals**—Highlights of the McCarran measure:

• **Civil aeronautics authority** would be formed to take over functions, other than safety, of Civil Aeronautics Board and Civil Aeronautics Administration.

It would be composed of seven members, no more than four from the same political party. They would receive salaries of $17,500 a year. A $17,000-a-year executive officer would handle administrative duties for the authority.

• **Air safety board** of five members, receiving $9,000 a year, would investigate accidents; make recommendations to the authority, National Advisory Committee for Aeronautics, and Weather Bureau; and undertake air safety studies.

At least one member would be an active pilot with not less than 3,000 hr. in scheduled operations, and at least one member a licensed private flier.

• **Nonsked certificates.** All exemptions to the requirement for a certificate of convenience and necessity would terminate 180 days after enactment, except for operators of aircraft weighing 12,500 lb. or less.

The bill would lump nonskeds and scheduled carriers into the single category of "air carrier" and require certificates of convenience and necessity for both.

The authority would, however, have leeway in certificating irregular operations. Instead of authorizing a specific route, for example, it could authorize a general territory to be served or a specific type of service, such as coach or freight for a wide territory.

• **Regulation of fixed-base operators.** All air contract operators would be required to obtain licenses. The procedure would be the same as that for obtaining a certificate of public convenience and necessity.

• **Experimental certificates.** McCarran looks on this new class of certificate as "protecting a man's right to lose his shirt" and keeping the doors of air transportation open to new enterprise.

To obtain an experimental certificate, the applicant would have to show only that he is "fit, able, and willing." He would not have to show that "public convenience and necessity" requires the service.

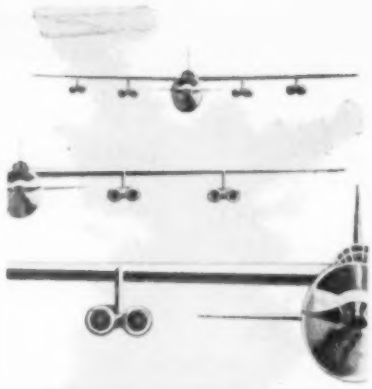
The experimental service could not duplicate an existing route, and not more than 20% of the operator's revenue could come from mail pay. The certificate would have a duration of three years, during which the operation would be protected from competition. If it were proved successful, application could be made for a permanent certificate.

• **Charter for private fliers.** A "bill of rights" for private fliers, exempting them from all regulation except for safety, is spelled out.

• **International agreements by treaty.** All agreements granting foreign nations air rights in the U.S. would have to take the form of treaties, subject to Senate confirmation.

Since the end of World War II, they have been negotiated by the Executive Branch as executive agreements. Foreign rights to U.S. entry not covered by treaties would require the same procedure before the authority as required of U.S. carriers for certificates of public convenience and necessity.

• **Control over international rates,** schedules, and fares would be given the authority. This power long has been recommended by CAB, which has control over the rates, schedules, and fares



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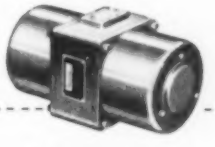

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of U. S. domestic, but not international, operations.

• **Mail pay rates.** Provisions of the 1938 act, under which mail pay rates took into consideration the "need" of a carrier, would be re-enacted.

McCarran stipulates that he does not want "to turn back the clock" and undo the separation of mail pay from subsidy that has been put into effect, but simply wants the situation reviewed.

► **Committee Change**—The Republican side of Senate Commerce Committee is substantially changed this year. Sen. John Bricker is firmly established as chairman as a result of the resignation of Sen. Homer Capehart.

Bricker became chairman last summer after the death of Sen. Charles Tobey, but Capehart, as top-ranking Republican, could claim the post.

Sen. John Sherman Cooper, who had been designated chairman of a subcommittee on aviation by Tobey, also has resigned for a place on the Labor and Public Welfare Committee.

Senators filling the Republican vacancies on Commerce Committee: James Duff, William Purtell, and Frederick Payner.

Antitrust Suit Names PAA, Panagra, Grace

An antitrust suit charging Pan American World Airways, W. R. Grace and Co. and Pan American-Grace Airways (Panagra) with restricting competition and monopolizing air transportation between U. S. and Latin America has been filed by Department of Justice.

The complaint alleges Pan American and Grace interests formed Panagra to exclude establishment of an independent competitive airline which would compete with Grace's parallel steamship route along South America's west coast and with air routes operated by Pan American. It was filed in Federal District Court, New York City.

Both Pan American and Panagra are charged with engaging in practices to impede the development of other U. S.-flag airlines authorized by Civil Aeronautics Board to engage in U. S.-Latin America air transportation.

► **Brownell View**—The suit seeks to divest both Pan American and the Grace Co. of their stock ownership in Panagra and to enjoin each of the defendants from engaging in "conduct restraining or monopolizing air transportation."

Attorney General Herbert Brownell, Jr., said the complaint seeks to free Panagra so it can develop independently and offer competitive service.

Stanley N. Barnes, assistant attorney general in charge of the Antitrust Division, said CAB has expressed concern over the persistent restraints upon Panagra's competitive development.

Airport Growth

- **New York's four fields set all-time traffic highs.**
- **Facility expansion in '54 will cost $27.3 million.**

Metropolitan New York's La Guardia, Idlewild International, Newark (N. J.) and Teterboro (N. J.) Airports handled a record 8,250,000 airline passengers in 1953, increasing 20% over 1952 and setting a daily average of 22,600 persons.

Port of New York Authority, operator of the airports, says $27,354,100 will be spent this year on development of new facilities to handle increasing traffic.

The 1954 budget provides for $23,648,200 for Idlewild International, $2,593,700 for Newark, $178,600 at La Guardia and $933,600 for Teterboro.

▶ **Federal Funds**—The four fields at present represent an investment by PNYA estimated at $98 million. The federal government and the cities of New York and Newark have made an additional $121 million available for development of the three major airports.

PNYA says this public investment of more than $219 million probably will be expanded by an additional $150 million to provide facilities required "to maintain the port district as the center of world air transportation."

▶ **New Highs**—The Port Authority reports these other new traffic highs were established at the four airports during 1953:

• **Cargo** carried by airlines increased 6% to 121,850 tons. Domestic airfreight totaled 107,535 tons, a 7% gain. Overseas cargo amounted to 14,322 tons.

• **Airmail** moved through the airports totaled 32,322 tons, 16% higher than the previous year. Start of first-class mail flights boosted domestic tonnage to 24,093, a 10% gain. International carriers accounted for 6,469 tons, a 9% increase.

• **Aircraft** traffic gained 10% during the year, bringing total arrivals and depatures at the four airports to 570,373. An estimated 316,260 of these were airline flights, an increase of 13%.

Non-carrier flights totaled 254,112, 8% higher than 1952. The Port Authority says this gain was produced almost entirely by a 28% increase in business aircraft flight activity, "a continuance in the rapid rise in this type of traffic which has been maintained for the past four years."

▶ **Busiest Terminal** — La Guardia handled the bulk of traffic in the New York area, accounting for 57% of the

Newark Airport Traffic

(Preliminary Report)

	1953	1951*	% Change 1953/1951
Passengers			
Domestic	1,116,845	1,319,697	−15.4
Overseas	12,508	35,476	−64.7
Total	**1,129,353**	**1,355,173**	**−16.7**
Cargo (Tons)			
Domestic	18,917	49,365	−61.7
Overseas	3	2,996	−99.9
Total	**18,920**	**52,361**	**−63.9**
Mail (Tons)			
Domestic	2,155	3,081	−30.1
Overseas	2	186	−98.9
Total	**2,157**	**3,267**	**−34.0**
Plane Movements			
Domestic Air Carrier	62,782	81,521	−23.0
Overseas Air Carrier	216	1,698	−87.3
Non-Air Carrier	18,050	16,958	+ 6.4
Total	**81,048**	**100,177**	**−19.1**

* Newark was closed Feb. 11, 1952 to Nov. 9, 1952, thus no comparable figures for that year.

SOURCE: Port of New York Authority.

La Guardia Airport Traffic

(Preliminary Report)

	1953	1952	% Change 1953/1952
Passengers			
Domestic	4,640,401	4,175,444	+11.1
Overseas	52,273	36,530	+43.1
Total	**4,692,674**	**4,211,974**	**+11.4**
Cargo (Tons)			
Domestic	55,628	50,397	+10.4
Overseas	81	91	−11.0
Total	**55,709**	**50,488**	**+10.3**
Mail (Tons)			
Domestic	20,112	17,409	+15.5
Overseas	32	25	+28.0
Total	**20,144**	**17,434**	**+15.5**
Plane Movements			
Domestic Air Carrier	169,224	157,622	+ 7.4
Overseas Air Carrier	1,323	1,060	+24.8
Non-Air Carrier	28,283	26,940	+ 5.0
Total	**198,830**	**185,622**	**+ 7.1**

Idlewild International Traffic

(Preliminary Report)

	1953	1952	% Change 1953/1952
Passengers			
Domestic	1,376,155	1,526,707	− 9.9
Overseas	991,518	820,797	+20.8
Total	**2,367,673**	**2,347,504**	**+ .9**
Cargo (Tons)			
Domestic	29,385	35,584	−17.4
Overseas	14,238	13,786	+ 3.3
Total	**43,623**	**49,370**	**−11.6**
Mail (Tons)			
Domestic	3,586	3,775	− 5.0
Overseas	6,437	5,886	+ 9.4
Total	**10,023**	**9,661**	**+ 3.7**
Plane Movements			
Domestic Air Carrier	47,110	66,929	−29.6
Overseas Air Carrier	32,729	31,576	+ 3.7
Non-Air Carrier	5,973	6,700	−10.9
Total	**85,812**	**105,205**	**−18.4**

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passengers, 54% of the flights, 45% of cargo and 62% of the mail.

Idlewild International's traffic rate equaled 1952's level of activity, despite the return of a number of flights to Newark after the New Jersey airport reopened Nov. 15, 1952.

Newark, the port district's leading field in 1951, was surpassed during the year by both La Guardia and Idlewild. But traffic at the airport last month equaled approximately the same level as December 1951, shortly before the field was closed after a series of airline crashes.

▶ **18,797 Workers**—Record traffic and expanding facilities forced the Port Authority and its airport tenants to increase the number of workers at the four fields to 18,797 persons regularly employed at an annual payroll estimated at $90 million.

This represented a 14.5% gain over 1952, when workers totaled 16,414 persons with earnings of $80.8 million a year.

CAB ORDERS

(Jan 8–18)

GRANTED:

Wien Alaska Airlines exemption to operate between Ft. Yukon and Arctic Village, Alaska.

Northeast Airlines permission to suspend service at Millinocket, Me., until suitable airport facilities are available.

Hawaiian Airlines and competitor Trans-Pacific Airlines fare-level agreements arrived at in joint discussions with CAB staff.

American Airlines request that certain evidence in the Niagara Falls airport case be withheld from public disclosure. American says it would serve no useful purpose and would provide competitors with economic data with adverse effect on AA.

American Automobile Assn. petition to intervene in the air traffic conference agency resolution case.

STARTED INVESTIGATING:

Cocket Airlines and Flying Services, Ltd., Hawaiian air taxi operators, applications to operate in the territory under the same regulations as intra-U. S. air taxis.

DISMISSED:

Northeast Airlines request for a cut-rate mail tariff for carrying preferential first-class holiday mail, similar to that granted to local service carriers. Carrier wrote CAB that Post Office said there was no need for the proffered service, and Northeast would not object to dismissal of the petition.

Trans American Airways application to change its name to "Air Bus, Inc." Carrier failed to reply to CAB's request for a certified copy of Trans American's amended articles of incorporation indicating a change of name.

TERMINATED:

Investigation of whether American's certificate should be amended to authorize service to Nogales, Ariz. CAB examiner found no need of the change. No parties took exception to this, so CAB adopted the examiner's decision.

SHORTLINES

▶ **Arkya Airlines**, subsidiary of El Al Israel National Airways, has inaugurated twice weekly flights between Tel Aviv-North and Rosh Pina and between Tel Aviv and phosphate mines in the Central Negev Desert, flying two eight-place, twin-engine de Havilland Dragon Rapides.

▶ **Avianca**, Colombian National Airways, now is flying regular airfreight service from New York to South America on a reserve basis. No extra charge is made for reserving freight space. Only a portion of each plane's cargo space is allotted for reserve freight, however.

▶ **British Overseas Airways Corp.** has begun nonstop luxury service between New York and Montego Bay, Jamaica. Tourist service now is provided from Miami to Jamaica.

▶ **Eastern Air Lines** is flying every-hour-on-the-hour service New York-Miami during the tourist season from 8 a.m. to 11 p.m. daily.

▶ **Japan Air Lines** has signed a servicing contract at Brownsville (Tex.) International Airport, an alternate stop on a new San Francisco-South America service. Aircraft Corporation of America will service JAL planes.

▶ **Pan American World Airways** has expanded its own communications system—direct radioteletype and cabled leased circuits—to speed reservations in its Puerto Rico, Virgin Islands and Cuban operations.

▶ **Pioneer Airlines** reports average load factor of 42.65% during 1953, compared to 41.82% the previous year. Company, which switched from Martin 2-0-2s during the year, now operates 10 DC-3s.

▶ **Rutas Aereas Nacionales** has CAB foreign air carrier permit from Maiquetia (Caracas), Maracaibo and Barcelona, Venezuela, via Aruba and Curacao, Kingston, to Miami.

▶ **United Air Lines** has sent two officials to England at the request of Lord Douglas of Kirtleside, chairman of the board of British European Airways, to describe reservations and space control techniques developed by U.S. lines.

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Three Years Old

About three years ago—Jan. 22, 1951, to be exact—the people who edit and publish AVIATION WEEK printed a by-line on this page and readers were subjected to the first copy of Cockpit Viewpoint. Since then a variety of subjects has appeared under this banner and it now seems appropriate to view them in retrospect.

The articles have been mostly about safety in the operational end of aviation; things that concern pilots. The thought lingers here that since the job of aviation is to move airplanes, these matters deserve high priority.

► **Objections**—Regulations and the lawmakers seem to be eternal targets for writers, so I too have occasionally aimed that way. Generally, I felt that CAB and CAA do not exhibit the intelligence and foresight expected of them in the matter of objective appraisals and acceptance of new theories.

On the subject of landing minimums, for instance, I objected (and still do) to the dogmatic adherence to weather observations as sole criteria and suggested a closer look at the critical height theories of IATA and others. While the new CAR Part 40 unbends a bit here, the old-fashioned ideas cling with bureaucratic tenacity. Likewise, CAB in its accident investigations, at times is so narrow that it lags behind the field in safety matters.

► **Airports**—Airports and their aviation aids also have come in for a share of attention. Approach lights, taxiway lights, signs, and markings have been kicked around at considerable length, and the continued political haggling on these items indicates that additional booting is necessary.

Pilot training has been discussed in half a dozen columns, with an eye toward more modern concepts. The old formula for a two-man airplane—captain plus a bookkeeper—gradually is being superseded by the "aircraft commander and crew" idea.

This theory has considerable effect, not only on cockpit management and control manipulation, but also on the entire training program. Closely related to pilot proficiency have been articles on the misuse of synthetic trainers and proper procedure for instrument flight checks.

► **Fun and Praise**—From the pilots' standpoint, much safety is achieved by making things simpler. In that category, this column has discussed regulations (such as weather minimums), NOTAMs (in readable language), traffic clearances (use of check point names rather than codes), and instrument approach procedure (problem of one man monitoring six radio frequencies and scores of dials).

There also has been time to poke fun. The results of ICAO's "fanatic" alphabet are heard daily along the airlanes.

And praise: to IATA, to Flight Safety Foundation and Crash Injury Research for vital safety and operational data.

All told, there have been many more articles of criticism than of praise, simply because it is easier to criticize. However, the effort always has been to promote worthwhile ideas even if it took a fuss to do it.

Whether or not the information in all this writing has been of any benefit to readers is not for me to answer. Certainly the author has learned a lot and if, by chance, some part of the aviation world has benefited by these words, fine. If that is the case, perhaps I can go on scribbling for a few more years.

(Editor's Note: AVIATION WEEK gives Capt. Robson an opportunity to express himself freely in this column. Comments from readers on his opinions are welcome.)

AVIATION CALENDAR

Jan. 25-28—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. Conference will be held concurrently at the Hotel Conrad Hilton.

Jan. 25-29—Institute of the Aeronautical Sciences, 22nd annual meeting, Hotel Astor, New York. Honors Night Dinner, Jan. 25. American Helicopter Society will present papers on transport and military copter design Jan. 25.

Feb. 1-5—American Society for Testing Materials, 1954 Committee Week with symposium on color of transparent media and design of experiments, Shoreham Hotel, Washington.

Feb. 3—25th Anniversary of Simulated Flight, observed by Link Aviation, Inc., Hillcrest, Binghamton, N. Y.

Feb. 3-5—Society of Plastics Industry, ninth annual division conference on reinforced plastics, Edgewater Beach Hotel, Chicago.

Feb. 4—Instrument Society of America, ninth annual regional conference, Hotel Statler, New York.

Feb. 4-5—Aeronautical Radio, Inc., general session of Airlines Electronic Engineering Committee (open to manufacturers), Hotel Statler, Washington, D. C.

Feb. 4-5—Arinc Airlines, quarterly meeting of Electronic Engineering Committee, Hotel Statler, Washington, D. C.

Feb. 11-12—American Institute of Electrical Engineers, western computer conference, Ambassador Hotel, Los Angeles.

Feb. 18-19—Institute of Radio Engineers and American Institute of Electrical Engineers, transistor circuits conference, Philadelphia.

Feb. 21-23—Third annual Texas Agricultural Aviation Conference, Texas A&M College, College Station, Tex.

Feb. 24-26—Ohio-Indiana Agricultural Aviation Conference, Ohio State University, Columbus, Ohio.

Mar. 5-7—Society of Women Engineers, national convention, Mayflower Hotel, Washington, D. C.

Mar. 22-25—Institute of Radio Engineers, national convention, Waldorf-Astoria Hotel and Kingsbridge Armory, New York.

Apr. 5-8—American Management Assn., 23rd National Packaging Exposition, Convention Hall, Atlantic City, N. J.

Apr. 14-16—Society for Experimental Stress Analysis, spring meeting, Netherlands Plaza Hotel, Cincinnati.

Apr. 19-20—Symposium on automatic production of electronic equipment, sponsored jointly by Standard Research Institute and USAF, Fairmont Hotel, San Francisco.

Apr. 21-24—Second annual student paper competition for undergraduates and graduates, sponsored by the Texas section of IAS, Melrose Hotel, Dallas.

Apr. 22-23—American Institute of Electrical Engineers, conference on feedback control, Claridge Hotel, Atlantic City, N. J.

May 4-6—1954 Electronic Components Symposium, Department of Interior auditorium, Washington, D. C.

May 5-7—Third International Aviation Trade Show, managed by Aircraft Trade Shows, Inc., 71st Regiment Armory, New York.

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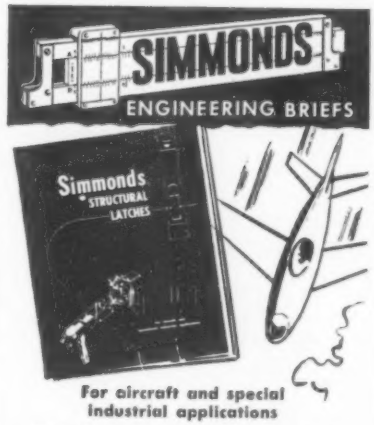

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LETTERS

Good Reporting

Enclosed is a reprint of an article published in the current issue of the California Law Review. As you will note, I made extensive use of AVIATION WEEK as a primary source for the factual basis of this legal discussion. This was possible because of the high standard of reporting you have consistently followed. It was a very considerable aid to me to be able to follow the developments of the aircoach, particularly on the Los Angeles-San Francisco run, which gave rise to this very interesting and challenging legal problem.

Please feel free to use this reprint as you see fit. I take the liberty of sending it to you because of your well expressed views regarding aircoach development, which I share, as well as a satisfied customer of your magazine.

MARVEL M. TAYLOR
300 Montgomery Street
San Francisco 4, Calif.

'Canned Engines'

We appreciate the publicity given the reusable metal shipping and storage container business in your Dec. 21 issue, by the article "Canning Engines Saves $9 Million." However, the casual reader may think that only one manufacturer of these containers exists.

Our company, the Buffalo Metal Container Corp. (formerly A. E. Bausenbach, Inc.) has been designing and manufacturing metal containers and ground handling equipment for aircraft engines, missiles, torpedoes, gun turrets, tank transmissions, bombsights, gyro units, pumps and many smaller items since 1944. The J47 Engine Container, mentioned in the article, is our design. It has been approved by the Air Force and General Electric as a standard.

Our reuseable metal shipping and storage containers for aircraft engines were the first to qualify under Mil-C-5584. We were the first to be permitted to drop test a container with an actual aircraft engine installed.

J. M. GWINN III, Chief Engineer
Buffalo Metal Container Corp.
35 Roetzer Street, Buffalo 11, N. Y.

Australian Protests

I refer to an article headed "RAAF Flies Obsolete Aircraft," in your issue of Aug. 10, 1953. Your correspondent must be grossly misinformed of the facts, for who would claim the Canberra and Sabre as obsolete? Or are the RAF and USAF flying obsolete aircraft also?

The only drawback to aeronautical progress in Australia at the moment is the lack of funds allocated to foster local design. Given the opportunity, local aeronautical talent could well cope with the technical problems of aircraft production and design to a much greater extent than that exhibited in its restricted form at the present moment.

The added expense of these projects, due of course to limited demand and hence limited numbers produced, may well be regarded as a valuable insurance premium to keep Australia safe, as experience in World War II has proved to us only too forcibly not to depend too greatly on foreign aid in an emergency.

W. L. KUTTNER
37 Illeroy Avenue
Killara, Australia

Side-by-Siders

We have noted with considerable interest, the article, "Why Ryan Bets on Side-by-Side Trainer," in your issue Nov. 30.

While reference is made to British advanced side-by-side trainers, I would like to point out that Royal Air Force ab initio basic training has been carried out in the side-by-side seater Percival "Prentice" since 1947 and that the same seating arrangement, namely side-by-side, has been perpetuated in the Percival Provost T.Mk.I now replacing the Prentice in the Royal Air Force.

You will, therefore, see that the present RAF training sequence to wings standard i.e. "Provost/Vampire" is 100% side-by-side seating.

From our long and close association with RAF training at all levels we can confidently assert that any earlier protagonists of tandem seating now whole-heartedly recognize the disadvantages of this arrangement and the almost incalculable advantages of the side-by-side seating arrangement in ab initio basic flying training.

With reference to the statement in the penultimate paragraph of your contributor's (WJC) article that there are "many arguments against side-by-side seating," whilst we ourselves have in the past heard views expressed against this layout, we have yet to find a single flying instructor with long and actual experience of both arrangements who is not wholeheartedly in favor of side-by-side seating.

It would, therefore, be of great interest to hear of the arguments referred to by your contributor and of the practical experience of those who express these views.

Finally, we should like to have your permission to use Mr. Danch's comments in the article. These we would reproduce, with due acknowledgement to AVIATION WEEK, in support of our current sales literature.

D. M. BAY, Assistant Sales Manager
Percival Aircraft, Ltd.
Bedfordshire, England

Davis Barrier Again

I read with interest and enjoyment the "Letters to the Editor," in your Dec. 28 issue on the subject of "Davis Crash Barriers."

I must admire the Navy's "Esprit de Corps" in their replies and the editor's comment was very accurate.

It might be of interest to the "ruffled bluejackets" to know that specific credit was given to the U. S. Navy for the Davis nylon barrier principle and the original idea of using chain as a decelerating device in conjunction with the landing hook. Reference to both ideas was given in the "Report of Development" covering the AF system. Suggest they secure "same," read "same."

JOHN E. SNOW, Capt.
USAF Project Engineer
HQ WADC Bx 7543,
Wright-Patterson AFB
Dayton, Ohio

Praise

Irving Stone made a very excellent presentation of Fairchild's small 144 turbojet in the Dec. 7 issue. In addition to the accurate and comprehensive editorial treatment, this article is excellently illustrated.

DONALD H. JENSEN
Pub. Rel. and Advertising Mgr.
Fairchild Engine Div.
Farmingdale, Long Island, N. Y.

Design Panel 'A Flop'

I have read with interest your article in AVIATION WEEK relative to the National Business Aircraft Assn. meeting in St. Louis, and I concur wholeheartedly with you that the design panel forum was a complete flop and disappointing.

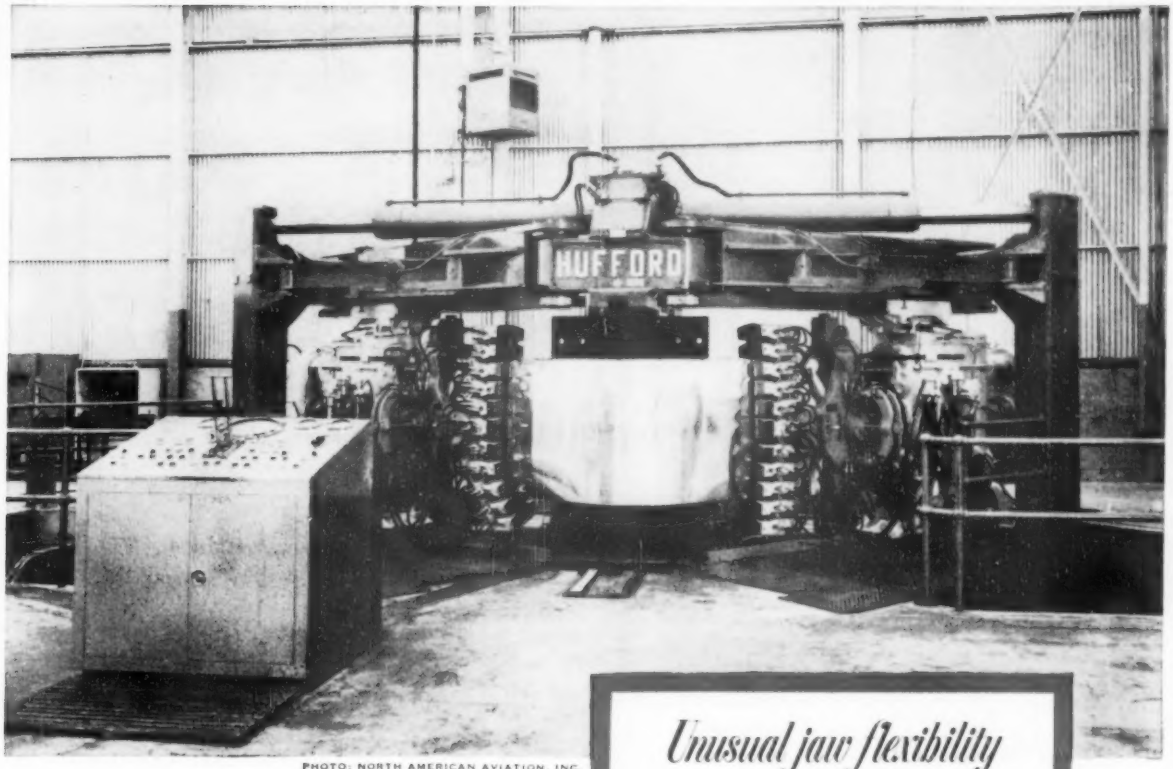
As you recall, the facts were brought out repeatedly that the aircraft manufacturers were not willing to gamble the investment necessary to produce an airplane on a speculative basis, due primarily to the lack of an organized requirement specifying in detail the exact specifications the end product must meet.

As you know, Lear, through our own needs for an increased performance airplane, has organized a new division for the express purpose of doing something about this deficiency for the business aircraft users. We have assembled a group of the best engineers and technicians available from all sections of the country, and through these combined experiences and knowledge, we have compiled specifications which we believe most nearly fit the needs of the greater percentage of executive aircraft users.

With these specifications, a million-dollar investment of our own money, and the application of the latest design techniques, we are producing the converted Lodestar, now more commonly known as the "Learstar," with the result of an increased performance to equal most present-day airline schedules.

This now brings me to your article above mentioned. Your quotation of me is slightly in error. Instead it should read: "The aircraft now cruises at an indicated airspeed of 245 mph. at 10,000 feet with the use of Wright 1820-9HE engines producing 750 hp. each."

A. A. CRUSE, Div. Gen. Mgr.
Lear, Inc.
Santa Monica, Calif.



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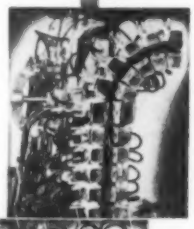

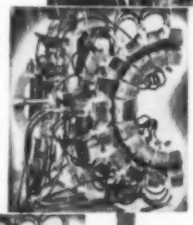

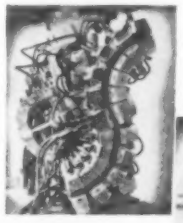

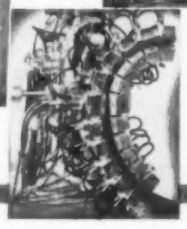

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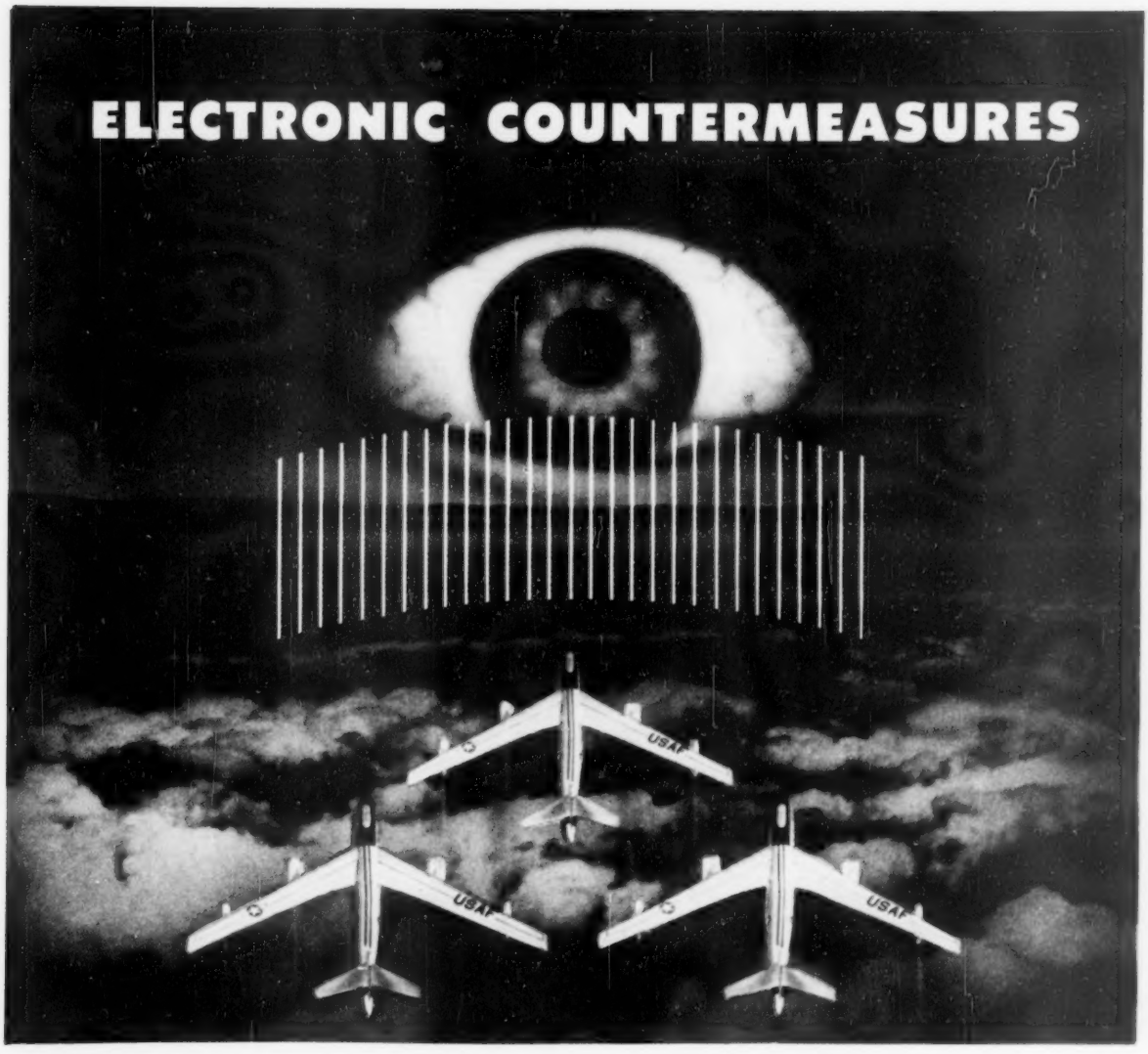

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